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Primary epithelial minor salivary gland tumours: a 20-year retrospective audit of cases in the oral pathology unit at the University of the Witwatersrand, Johannesburg

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PRIMARY EPITHELIAL MINOR SALIVARY GLAND TUMOURS: A 20-YEAR RETROSPECTIVE AUDIT OF CASES IN THE ORAL PATHOLOGY UNIT AT THE UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

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A Research Report (Neus7009) submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirement for the degree of Master of Medicine in Otorhinolaryngology (MFOSENTS60)

Student number: 1149513

Johannesburg, November 2018

DECLARATION

Candidate

I, Dr Yaseer Mahomed, declare that this Research Report is my own, unaided work. It is being submitted for the degree of Master of Medicine in Otorhinolaryngology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Signed 

6th day of November 2018

DEDICATION

To my loving wife Faatima for her encouragement and endless support.

To my dearest son Muhammad Abdullah and my parents,
Shabir and Yasmin for their love and support.

I thank you with all my heart.

ABSTRACT

Introduction*:* Minor salivary gland tumours are uncommon, representing 9 to 25% of all salivary gland tumours. Recent South African reports on the demographics of minor salivary gland tumours are lacking.

Aim*:* The aim is to evaluate the frequency, clinical epidemiology and histological types of minor salivary gland tumours in the Department of Oral Pathology, University of the Witwatersrand from 1997 to 2016.

Methods*:* This cross sectional retrospective audit included a review of the histology reports of all patients diagnosed with benign and malignant major and minor epithelial salivary gland neoplasms. Epidemiologic data including age, gender, site, histologic subtype and incidence for each patient was recorded. The tumours were classified according to the 2005 WHO Classification of salivary gland tumours.

Results*:* There were 553 (2.32%) minor salivary gland tumours, of which 315 (57%) were benign and 238 (43%) malignant. Patients ranged from 9 and 93 years. There was no statistically significant age difference between male and females (p=0.64). Benign tumours occurred much earlier than malignant tumours for both sexes (p=0.00). There was no statistically significant gender difference (p=0.18) for benign and malignant tumours in females (55%; 45% respectively) and males (61%; 39% respectively). The three most common histologic types for both genders were pleomorphic adenoma (52%), adenoid cystic carcinoma (12%) and mucoepidermoid carcinoma (10%). Females were more likely to have malignant tumours than males. The most common sites were the palate (56%) followed by the cheek (11%), lip (9%) and paranasal sinuses (7%). Benign tumours were more prevalent in the palate, and malignant tumours were more prevalent at sites other than the palate (p<0.05).

Conclusion: Benign (57%) and malignant (43%) minor salivary gland tumours represent about 2% of the total number of cases diagnosed over the 20-year period. Although the incidence of minor salivary gland tumours was much higher than most previous reports, no overall increase in the number diagnosed per year was observed. Minor salivary gland tumours were more prevalent in females. Benign tumours occurred at a much younger age than malignant tumours. This study serves as a baseline for future studies, especially in South Africa.

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LIST OF ABBREVIATIONS

CMV	Cytomegalovirus
DNA	Deoxyribonucleic acid
EBV	Epstein-Barr virus
HPV	Human papilloma virus
HHV-8	Human herpes virus 8
NOS	Not otherwise specified
PLGA	Polymorphous low-grade adenocarcinoma
SGT	Salivary gland tumour
SGTs	Salivary gland tumours
WHO	World Health Organisation

CHAPTER 1

1. INTRODUCTION

Salivary gland tumours (SGTs) are uncommon. The reported incidence of epithelial SGTs in the literature ranges from 2 to 6% of neoplasms that arise in the head and neck (Jansisyanont, Blanchaert & Ord, 2002; Toida et al. 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon 2012; Erovic et al., 2015; Lukšić et al., 2012; Wang et al., 2007). These tumours predominantly affect the major salivary glands, and in particular the parotid gland, in which approximately 80% of tumours tend to be benign (Strick et al., 2004). Whilst most SGTs of the major salivary glands are benign, the inverse is true for tumours of the minor salivary glands, in which approximately 80% tend to be malignant (Strick et al., 2004).

Minor SGTs are especially uncommon (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon, 2012; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008; Junqueria & Carneiro, 2003; Horn-Ross, Ljung & Morrow, 1997; Tilakaratne et al., 2009; Abrahão et al., 2016; Taghavi et al., 2016; Lawal et al., 2015; Sarmento et al., 2016; Shen et al., 2018). Even though these tumours are rare, anecdotally there appears to be a rise in the number of minor SGTs diagnosed and treated in the Department of Otorhinolaryngology, University of the Witwatersrand over the last three years (2015-2017).

Whilst there have been many international publications including African reports on the frequency and distribution of both major and minor salivary gland neoplasms, there is a dearth in the literature regarding South African studies. To the best of our knowledge, there are very few South African publications on the demographics of intraoral minor SGTs (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell

& Brannon, 2012; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008) and none within the last ten years. Furthermore, there have been differing reports on the incidence of SGTs from different countries and continents in the literature, and interestingly there has even been a report highlighting geographic variation in incidence of minor SGTs within the same country (Shen et al., 2018).

Patients with salivary gland neoplasms often present to general practitioners, otorhinolaryngologists, maxillofacial surgeons, plastic surgeons and general surgeons at various stages of the disease process. These tumours often pose challenges for both the surgeon and patient. The clinical features of these tumours are often insufficient to differentiate a benign from a malignant tumour. In many cases, the diagnosis is confirmed following resection of the tumour that frequently affects surgical treatment, resulting in more extensive or radical surgical procedures than initially indicated (Nanci, 2012; Gleeson, 2008).

The global epidemiology of salivary gland neoplasms varies considerably. As mentioned, there are many international including African large-scale retrospective studies on SGTs, however recent studies in South Africa are lacking. There are relatively few studies in the literature, many of which comprise small sample numbers. The types of malignant tumours that predominate vary considerably in different studies. This study thus aims to identify the most common tumours and their associated demographics occurring in the South African setting.

CHAPTER 2

2. LITERATURE REVIEW

2.1 Anatomy

SGTs occur in both major and minor salivary glands. Major glands constitute the parotid, submandibular and sublingual glands (Jansisyanont, Blanchaert & Ord, 2002). Minor salivary glands constitute about 600 to 1000 glands located throughout the oral cavity within the submucosa of the buccal, labial and lingual mucosa, retromolar area, soft palate, and lateral parts of the hard palate, floor of mouth, tongue and paranasal sinuses (Nanci, 2012; Gleeson, 2008). The single duct of each minor salivary gland secretes directly into the oral cavity saliva that is either serous, mucous or mixed in nature (Hollinshead, 1982).

Postganglionic parasympathetic innervation is from the lingual nerve except for the palatal glands, which are supplied by the palatine nerves that exit the sphenopalatine ganglion (Nanci, 2012; Gleeson, 2008). The blood supply of the gland as well as the venous and lymphatic drainage are determined by its anatomic site (Nanci, 2012; Gleeson, 2008).

2.2 Histology

Overall, glands are epithelial in origin, comprising parenchyma, the secretory unit and ducts, and surrounding connective tissue stroma which intersects the gland into lobules (Junqueria & Carneiro, 2003). The glands comprise endocrine glands with no ducts and exocrine glands with ducts through which their products are secreted (Junqueria & Carneiro, 2003).

Salivary glands are exocrine glands which secrete saliva through ducts of the salivary acinus, which may be serous, mucinous or mixed (Junqueria & Carneiro, 2003). Serous acini are spherical cells which discharge a watery protein secretion via exocytosis that is marginally glycosylated or non-glycosylated from secretory granules (Junqueria & Carneiro, 2003). The acinar cells are pyramidal with basally located

nuclei encased by dense cytoplasm, and numerous secretory granules at the apex (Junqueria & Carneiro, 2003).

Mucinous acinar cells have mucin within secretory granules and when hydrated release mucous (Junqueria & Carneiro, 2003). These cells are columnar with flattened, basally situated nuclei and clear cytoplasm (Junqueria & Carneiro 2003). Mixed seromucinous acini are composed of both serous and mucinous cell types; however, a single secretory unit is usually prominent (Junqueria & Carneiro, 2003).

Minor SGTs may be benign or malignant. They are usually classified according to the cell of origin, which often forms the major component of the neoplasm (Gleeson, 2008). Salivary gland neoplasia is diverse, and often arises within precursor cells (Gleeson, 2008). The common thread of the four postulated theories in the pathogenesis proposes that precursor cells have a potential to give rise to a neoplasm (Gleeson, 2008). The most common accepted theory is the semipleuripotent bicellular reserve cell theory. According to this theory, only basal cells of the excretory duct and progenitor cells of the intercalated duct are capable of cell division, and thus these cells give rise to neoplasms (Gleeson, 2008).

2.3 Aetiology

Aetiological risk factors in salivary gland neoplasm have not been clearly recognised due to the rarity of this disease entity and remain unknown. Radiation exposure, smoking and vitamin A deficiency, occupation in rubber manufacture and hair dyes, and a previous history of tumours have been implicated as risk factors (Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Guzzo et al., 2010; Horn-Ross, Ljung & Morrow, 1987).

Smoking has been a predominant carcinogen in many cancers including squamous cell carcinoma of the head and neck, however only a few studies have examined the risk of carcinogenesis in salivary glands (Sawabe et al., 2017; Hühns et al., 2015). Heavy smokers showed a higher risk compared to non-smokers for malignant SGTs overall and alcohol consumption showed no association with malignant SGTs (Sawabe et al., 2017 Hühns et al., 2015). Whist a few studies have shown an

increased risk of SGTs in tobacco smokers and alcohol users, unlike most head and neck cancers this strong correlation is not evident in SGTs (Radoï et al., 2018).

Similarly, there are conflicting results regarding the role of viruses and the oncogenesis of SGTs. A host of various DNA viruses, namely EBV, HPV, HHV-8, CMV and polyomaviruses have been demonstrated in SGTs (Hühns et al., 2015; Chen et al., 2017). Whilst EBV has been implicated in lymphoepithelial carcinoma and nasopharyngeal carcinoma, its conclusive role in the aetiology of SGTs remains elusive (Hühns et al., 2015; Chen et al., 2017).

Further, Chen et al. (2017) showed a high percentage of EBV (46%) and HPV (11%) positivity in Warthin tumour and HPV (19%) in pleomorphic adenoma, however further studies are warranted to solidify these claims. HHV-8 is associated with Kaposi sarcoma, and even though the study on 200 patients by Hühns et al. (2015) showed a strong association of HHV-8 and Warthin tumour, its association with tumorigenesis in SGTs remains debatable.

Whilst the oncogenic role of HPV in squamous cell carcinoma of the head and neck has been extensively established, conclusive proof of its role in the tumorigenesis of SGTs remains elusive. The study by Hühns et al. (2015) found that 10% of the 200 patients with malignant SGTs were HPV positive; HPV16 being the most predominant subtype. HPV positivity was present in 21% of adenoid cystic carcinomas and 15.7% of adenocarcinoma, not otherwise specified (NOS).

The aetiopathogenesis of SGTs remains largely unknown. Factors mentioned above such as exposure to ionising radiation, especially radiotherapy and exposure during dental and cervicofacial radiological procedures, occupational exposures such as farm workers, hairdressers and rubber industry workers, as well as dietary factors, a high body mass index, use of mobile telephones, a familial cancer history and certain viral infections have all been implicated in the increased risk of SGTs (Radoï et al., 2018). Further studies on larger populations are required to elucidate the positive association of aetiological risk factors in SGTs.

2.4 Classification and terminology

This study pertains only to all primary epithelial salivary gland neoplasms that were classified according to the previous World Health Organisation (WHO) classification of SGTs using the 2005 classification (Table 1), which is considered the standard pathology classification (Tilakaratne et al., 2009), and did not include metastatic tumours, haematolymphoid tumours and soft tissue tumours. Since then, there have been several reports redefining certain tumours and introducing new tumours (Seethala & Stenman, 2017). This study however does not encompass the terminology of minor SGTs described in any of the later editions beyond the study period in its review.

At a consensus meeting of the WHO held in Lyon, France in 2016, the previous WHO classification of SGTs was revised and updated and since then the latest amended 4th edition of the WHO classification of SGTs was published in 2017 (Skalova, 2017; Seethala & Stenman, 2017). Descriptions and inclusions of several new entities were included. The rationale for the amendments is based on the premise that changes in the morphologic features of the new described entities and the accompanying ancillary diagnostic tools may help with the differential diagnoses of salivary gland neoplasms.

Primary malignant salivary epithelial tumours included in the latest WHO classification (2017) since the previous classification of 2005 include secretory carcinoma, intraductal carcinoma and poorly differentiated carcinoma (Seethala & Stenman, 2017). Secretory carcinoma was extracted mainly from acinic cell carcinoma based on recapitulation of breast secretory carcinoma (Skalova, 2017). Poorly differentiated carcinomas are primary carcinomas of the salivary glands, which include both large and small cell types, with or without neuroendocrine differentiation (El-Naggar et al., 2017). Polymorphous low-grade adenocarcinoma (PLGA) is now termed polymorphous adenocarcinoma (Skalova, 2017; Seethala & Stenman, 2017).

As mentioned, this is a retrospective analysis of minor SGTs during the period 1997 to 2016 and therefore only the primary epithelial salivary neoplasms as classified by the WHO in 2005 (Barnes et al., 2005) (Table1) were included in the audit.

Table 1: WHO histological classification of epithelial tumours of the salivary gland (Barnes et al., 2005)

MALIGNANT EPITHELIAL TUMOURS	BENIGN EPITHELIAL TUMOURS
Acinic cell carcinoma	Pleomorphic adenoma
Mucoepidermoid carcinoma	Myoepithelioma
Adenoid cystic carcinoma	Basal cell adenoma
Polymorphous low-grade adenocarcinoma (PLGA)	Warthin tumour
Epithelial-myoepithelial carcinoma	Oncocytoma
Clear cell carcinoma (NOS)	Canalicular adenoma
Basal cell adenocarcinoma	Sebaceous adenoma
Sebaceous carcinoma	Lymphadenoma
Sebaceous lymphadenocarcinoma	Sebaceous
Cystadenocarcinoma	Non-sebaceous
Low-grade cribriform cystadenocarcinoma	Ductal papillomas
Mucinous adenocarcinoma	Inverted ductal papilloma
Oncocytic carcinoma	Intraductal papilloma
Salivary duct carcinoma	Sialadenoma papilliferum
Adenocarcinoma (NOS)	Cystadenoma
Myoepithelial carcinoma	
Carcinoma ex pleomorphic adenoma	
Carcinosarcoma	
Metastasising pleomorphic adenoma	
Squamous cell carcinoma	
Small cell carcinoma	
Large cell carcinoma	
Lymphoepithelial carcinoma	
Sialoblastoma	

2.5 Prevalence

SGTs are a heterogeneous group of tumours in the upper aerodigestive tract. International reports show these tumours to be uncommon, and the incidence of SGTs in the literature ranges from 3 to 6% in head and neck neoplasms (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon, 2012; Erovic et al., 2015; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008; Junqueria & Carneiro, 2003; Horn-Ross,

Ljung & Morrow, 1997; Tilakaratne et al., 2009; Abrahão et al., 2016; Taghavi et al., 2016; Lawal et al., 2015; Sarmento et al., 2016).

There are several reports, mainly retrospective studies, on the distribution of epithelial minor SGTs. The prevalence of minor SGTs varies in different series nationally and internationally. Previous reports show that 80% or more of the minor SGTs are malignant compared to only 20% for SGTs of the major glands (Strick et al., 2004). Both benign to malignant minor SGTs varied in incidence between 27.5% and 72.5% (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon, 2012; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008; Junqueria & Carneiro, 2003; Horn-Ross, Ljung & Morrow, 1997; Tilakaratne et al., 2009; Abrahão et al., 2016; Taghavi et al., 2016; Lawal et al., 2015; Sarmento et al., 2016).

Minor SGTs account for 9 to 25% of all SGTs. Most studies report on a combined incidence of both major and minor SGTs, and do not separate the incidence of SGTs of the major versus the minor glands (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon, 2012; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008; Junqueria & Carneiro, 2003; Horn-Ross, Ljung & Morrow, 1997; Tilakaratne et al., 2009; Abrahão et al., 2016; Taghavi et al., 2016; Lawal et al., 2015; Sarmento et al., 2016).

2.5.1 South African studies

A South African study by Isacsson & Shear (1983) on 201 patients focussed solely on minor SGTs and showed benign and malignant SGTs in 72.5% and 28% of patients respectively. The most common benign tumour was the pleomorphic adenoma (70%) followed by what was previously termed monomorphic adenomas (5%). Malignant tumours in decreasing frequency were adenoid cystic carcinoma (10.44%), adenocarcinoma (7.46%) and mucoepidermoid carcinoma (6.47%).

Van Heerden & Raubenheimer (1991) in their study over 8 years showed 34 benign SGTs (48%) and 36 (52%) malignant SGTs. The prevalence of minor SGTs was not documented.

2.5.2 African studies

Similar to the South African reports, a study from Nigeria by Gbotolorun et al. (2008) reviewed 146 cases over 24 years and found that 40.4% of SGTs involved the minor glands, and that most tumours were malignant (62.3%). Pleomorphic adenoma was still the most common tumour (34.2%), followed by basal cell adenoma (2.1%) and myoepithelioma (1.4%). The three most common malignant tumours in their study were mucoepidermoid carcinoma (28%), adenoid cystic carcinoma (27%) and adenocarcinoma (27%).

A Ugandan study of 268 patients by Vuhahula (2004) showed that 32.8% of tumours involved the minor SGTs and 67.8% involved the major SGTs. Pleomorphic adenoma was also the most common benign tumour (73.8%) and the most common malignant tumours were adenoid cystic carcinoma (29.3%) followed by mucoepidermoid carcinoma (20.3%) and acinic cell carcinoma (13%).

Similarly, a Zimbabwean study by Chidzonga, Lopez Perez & Portilla-Alvarez (1995) showed 37.6% of tumours of salivary gland origin involved the minor salivary glands. Pleomorphic adenoma was the most common benign tumour (73.6%). However, even though adenoid cystic carcinoma was the most common malignant SGT reported, the number of malignant minor SGTs was not reported in this study.

2.5.3 Asian studies

A study from China by Shen et al. (2018) showed that 16.9% of SGTs arose from minor salivary glands; 60.6% of these were benign and 39.3% malignant. These findings were similar to the findings of a Japanese report by Toida et al. (2005). Another study from China by Wang et al. (2007) on 737 minor SGTs showed a higher percentage of malignant tumours (53.9%) compared to benign tumours (46.1%). The most common benign tumours were pleomorphic adenoma (37.3%), myoepithelioma (6.6%), cystadenoma (0.8%) and basal cell adenoma (0.5%). The most common

malignant tumours were adenoid cystic carcinoma (19.4%), mucoepidermoid carcinoma (12.4%), adenocarcinoma (NOS) (5.6%) and PLGA (4.6%).

Studies from Pakistan (Rahman et al., 2008) and Sri Lanka (Tilakaratne et al., 2009) have shown incidence rates for minor SGTs of 0.3% and 1.73% respectively with an almost equal ratio of benign (49.1%) to malignant tumours (50.9%). In studies by Toida et al. (2005); Wang et al. (2007) and Shen et al. (2018), the most common benign tumour was pleomorphic adenoma (65.9%, 37.3% and 19% respectively) and the most common malignant tumour was adenoid cystic carcinoma (12.2%, 19.4% and 17% respectively). The Sri Lankan study (Tilakaratne et al., 2009) concurred with two American studies in reporting mucoepidermoid carcinoma (25.5%) to be the most common malignant tumour followed by adenoid cystic carcinoma (16.67%) (Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007).

2.5.4 American and European studies

A study of minor SGTs from 1991 to 2001 by Jansisyanont, Blanchaert & Ord (2002) of minor SGTs showed that 23.7% were benign and 76.3% were malignant. A large-scale review of 380 cases from America by Buchner, Merrell & Carpenter (2007) showed the incidence of minor SGTs to be 0.4% of all biopsy specimens, of which 59% were benign and 41% were malignant.

In both the American studies (Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007), the most common benign tumour was pleomorphic adenoma (21.3% and 39.2% respectively). Contrary to the South African studies (Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991) mucoepidermoid carcinoma (41.3% and 21.8% respectively) was by far the most common malignancy followed by PLGA (11.3% and 7.1% respectively) and adenoid cystic carcinoma (8.8% and 6.3% respectively) (Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007).

A study from Croatia over 25 years (Lukšić et al., 2012) showed that 41.65% of SGTs involved the minor glands of which 41% were benign and 59% malignant. Similar to the South African studies (Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991), of all the benign tumours pleomorphic adenoma (96.7%) was the most common

and adenoid cystic carcinoma (49.6%) was the most common of the malignant tumours, followed by mucoepidermoid carcinoma (14.4%) (Lukšić et al., 2012).

Most studies from South America (Barros et al., 2010; Abrahão et al., 2016; Sarmento et al., 2016) showed the ratio of benign to malignant tumours to be almost equal. An exception was the study from Brazil (Loyola et al., 1995) which showed that 62% of the SGTs were benign and 38% were malignant.

Studies from around the world show discrepancies in prevalence and percentage of benign versus malignant tumours. One of the factors cited for this is referral bias to cancer treatment centres or oral pathology institutions that specialise in malignant cases. In most studies the most common benign minor SGT is a pleomorphic adenoma (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Wang et al., 2007; Van Heerden & Raubenheimer, 1991; Guzzo et al., 2010; Gbotolorun et al., 2008) and the most common malignant minor SGT is adenoid cystic carcinoma followed by mucoepidermoid carcinoma (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Ritwik, Cordell & Brannon, 2012; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Van Heerden & Raubenheimer, 1991; Rivera-Bastidas, Ocanto & Acevedo, 1996; Guzzo et al., 2010; Gbotolorun et al., 2008). A difference noted in the USA (Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007) and Sri Lanka (Tilakaratne et al., 2009) was that mucoepidermoid carcinoma was the most common malignant minor SGT followed by adenoid cystic carcinoma in Sri Lanka and PLGA in the USA. Great geographic and ethnic variability exists in the incidence of malignant tumours of the minor salivary glands.

2.6 Patient demographics

2.6.1 Age

There is a marked age difference in patients with minor SGTs. What is consistent is that malignant lesions present at a significantly later age than benign lesions do. The average age of patients with benign and malignant minor SGTs ranged from the third to fifth decades and from the fifth to seventh decades respectively (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Ritwik, Cordell & Brannon, 2012; Gbotolorun et al.,

2008). Most studies show the mean age of presentation of benign minor SGTs tumours to be 3 to 10 years younger than that of malignant minor SGTs (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Lukšić et al., 2012; Wang et al., 2007; Strick et al., 2004; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Gbotolorun et al., 2008).

2.6.1.1 *South African studies*

As regards the age of patients in the South African series, the mean age for benign lesions was 36.5 years and that of malignant lesions 49.8 years (Van Heerden & Raubenheimer, 1991). Isacsson & Shear (1983) showed a similar mean age for benign tumours, with malignant SGTs occurring in significantly older patients. They reported uniform age distribution for malignant lesions ranging from 20-79 years.

2.6.1.2 *African studies*

Studies from Nigeria (Gbotolorun et al., 2008) showed that the mean age for mucoepidermoid and adenoid cystic carcinoma correlated with South African studies (Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991), however adenocarcinoma occurred at a much younger age (mean, 35.9 years). The mean age for benign tumours was 33.1 years, which was significantly younger than that found in the South African series. A Ugandan study (Vuhahula, 2004) showed a similar trend with malignant tumours (mean, 43.1 years) occurring at a much later age than benign tumours (mean, 33.5 years). The Zimbabwean study (Chidzonga, Lopez Perez & Portilla-Alvarez, 1995) showed similar means for age for both sexes for benign and malignant SGTs (mean, 35 years).

2.6.1.3 *Asian studies*

A study from Japan (Toida et al., 2004) concurred that malignant tumours occur at an older age than benign tumours by an average of six years or more. It was difficult to extrapolate data and deduce any comparisons from other studies as most of these studies combined the demographic data of tumours from both the major and minor glands (Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Wang et al., 2007; Tilakaratne et al., 2009; Shen et al., 2018). Furthermore, a Pakistan study (Rahman et

al., 2008) included only malignant minor SGTs and thus a comparison was not possible.

2.6.1.4 *American and European studies*

Interestingly, the study done in America by Jansisyanont, Blanchaert & Ord (2002) showed the mean age at presentation of malignant lesions to be six years younger than that of benign lesions. Some studies (Buchner, Merrell & Carpenter, 2007) reported mean ages of individual tumours, whereas others combined the data of the mean ages of major and minor SGTs (Lukšić et al., 2012 Strick et al., 2004; Guzzo et al., 2010); thus precluding any comparison.

The South American studies (Loyola et al., 1995; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016) are in keeping with most published series.

2.6.2 Gender

Most reports showed patients with primary epithelial SGTs of the minor salivary glands to have a higher gender predilection for females than males.

2.6.2.1 *South African studies*

In the South African study by Isacsson & Shear (1983), 56% of the patients with minor SGTs were female and 44% were male. This is consistent with the report by Van Heerden & Raubenheimer (1991), which showed 62% of patients to be female and 38% male. No gender predilection for benign or malignant SGTs was documented.

2.6.2.2 *African studies*

In the Nigerian study of 146 cases, Gbotolorun et al. (2008) showed the distribution of minor SGTs amongst both sexes to be equal, with 73 tumours occurring in females and male respectively. However, a higher percentage of malignant tumours occurred in females (64.4%) compared to males (60.3%).

The Ugandan study of 268 cases (Vuhahula, 2004) showed an equal distribution of minor SGTs amongst all SGTs in females (15.67%) and males (14.55%). Of the minor SGTs, 47.7 % of the malignant SGTs occurred in females and 66.7% in males, which concurs with the report by Van Heerden & Raubenheimer (1991).

The Zimbabwean study by Chidzonga, Lopez Perez & Portilla-Alvarez (1995), showed that 81.13% of minor SGTs were benign compared to 18.86% which were malignant.

2.6.2.3 *Asian studies*

When considering gender predilection for minor SGTs as a whole, Wang et al. (2007) showed no real gender predilection. There was however a higher predilection for malignant SGTs in males with a ratio of 1.2:1. A recent Chinese study (Shen et al., 2018) also showed a higher predilection for females (59.4%) than males (40.6%).

A study in Japan by Toida et al. (2005) showed a higher predilection for females, with a female to male ratio of 1.9:1 for the total SGTs diagnosed, and a higher percentage of males (55.6%) diagnosed with malignant tumours. A study from Pakistan of 70 patients with malignant minor SGTs by Rahman et al. (2008) found a higher rate of malignancy amongst females than males, with a ratio of 1.4:1. Other reports from Asia also show a higher predilection for females (Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Tilakaratne et al., 2009).

2.6.2.4 *American and European studies*

Most studies from North and South America and Europe also show a higher incidence in female patients for both benign and malignant tumours (Jansisyanont, Blanchaert & Ord, 2002; Loyola et al., 1995; Ritwik, Cordell & Brannon, 2012; Guzzo et al., 2010; Lukšić et al., 2012; Buchner, Merrell & Carpenter, 2007; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Sarmento et al., 2016).

2.6.3 Anatomical site

The most common anatomical site for both benign and malignant minor SGTs was the palate (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Rahman et al., 2008; Buchner, Merrell & Carpenter, 2007; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Barros et al., 2010; Gbotolorun et al., 2008; Abrahão et al., 2016; Sarmento et al., 2016). The second most common site was the buccal mucosa followed by the upper lip (Jansisyanont, Blanchaert & Ord, 2002; Toida et al., 2005; Loyola et al., 1995; Wang et al., 2007; Van Heerden & Raubenheimer, 1991; Tilakaratne et al., 2009; Abrahão et al., 2016).

Various other studies showed the paranasal sinuses rather than the buccal mucosa to be the second most common site of involvement; Iran (13.5%) (Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013), Croatia (17%) (Lukšić et al., 2012) and Nigeria (21%) (Gbotolorun et al., 2008). The study from Pakistan by Rahman et al. (2008) showed palatal involvement in 56% of cases, followed by the tongue (10%) and the floor of mouth (10%) with no tumours noted in the buccal mucosa. The lip was the second most common site followed by the buccal mucosa in the American study (16.8% and 12.9% respectively) (Buchner, Merrell & Carpenter, 2007) and the Venezuelan study (14.2% and 9.7% respectively) (Riviera-Bastidas, Ocanto & Acevedo, 1996).

Most of the published reports did not specifically state the exact location of the SGT within the palate. The two exceptions were the study by Ritwik, Cordell & Brannon (2012) which showed the distribution of mucoepidermoid carcinoma in adolescents, where 9 out of 15 tumours occurred in the hard palate, 5 of 15 tumours occurred at the palatal junction and 2 occurred in the soft palate, and the Brazilian study by Barros et al. (2010) which showed the hard palate (55.8%) to be more common than the soft palate (13.4%).

The literature highlights the marked global variation in the incidence, demographics, clinical presentation, including anatomic site, and geographic distribution of SGTs. This report will emphasise these parameters as regard minor SGTs in South Africa.

CHAPTER 3

3. AIMS AND OBJECTIVES

3.1 Aim

The aim of this retrospective audit is to evaluate the frequency, clinical epidemiologic data, histological types and anatomical location of minor SGTs diagnosed in the Department of Oral Pathology, University of the Witwatersrand from 1997 to 2016, and to determine if any association exists between tumour type and patient clinical demographics.

3.2 Study objectives

3.2.1 To determine the number of minor SGTs diagnosed in the Department of Oral Pathology, University of the Witwatersrand, for each year of study during the study period, 1997 – 2016.

3.2.2 To establish whether there is an increase in the number of tumours of the minor salivary glands.

3.2.3 To determine the frequency and prevalence of each histological subtype.

3.2.4 To determine if any association exists between tumour type and age, gender and anatomical site.

3.2.5 To compare the findings of the minor salivary gland neoplasms to the major salivary gland neoplasms diagnosed over the same study period.

3.2.6 To compare these findings with other similar studies from different geographic locations nationally and internationally.

CHAPTER 4

4. MATERIALS AND METHODS

4.1 Study design

The study was a cross sectional retrospective study.

4.2 Data collection

The data of all patients diagnosed with benign and malignant major and minor salivary gland neoplasms obtained from the archives of the Department of Oral Pathology, University of the Witwatersrand, Johannesburg, South Africa was recorded.

4.3 Study period

The study period extended from 1st January 1997 to 31st December 2016.

4.4 Study population

Data included all patients with histological confirmation of SGTs, with emphasis on the minor SGTs, and included the age of the patient, gender, anatomic site, size of the tumour and year of diagnosis.

4.4.1 Inclusion criteria

- All patients with primary epithelial salivary gland neoplasms diagnosed as per the 2005 WHO Classification of SGTs (Table 1) (Barnes et al., 2005).
- All patients with SGTs whose histology results were available in the departmental records.
- Patients of all ages.
- Biopsies done at any clinical department but analysed at the Department of Oral Pathology, University of the Witwatersrand.

4.4.2 Exclusion criteria

- Patients with non-epithelial SGTs, metastatic tumours, haematolymphoid tumours and soft tissue tumours.
- Patients with incomplete records.

4.5 Statistical analysis

Data was recorded on a data collection sheet (Appendix A), then entered and stored on to Microsoft® Excel® spreadsheets. Statistical analysis was completed by STATA® volume 13, under the guidance of a biostatistician.

4.5.1 Data analysis and presentation

Standard statistical methods were employed. Counts, frequency tables and proportions were used to describe the categorical variables. A t-test was used for age, being a continuous variable. A chi-squared test was used to analyse the association between subtypes with the other variables. A multivariate logistic regression analysis (ANOVA) was used to assess the association between tumour types and other variables to control for confounders. A p value of < 0.05 was regarded as significant.

4.6 Ethics

This study was a retrospective clinical audit, and no patient consent was required. This study was approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (clearance certificate number: 170130) (Appendix B). Confidentiality was adhered to strictly. Patients' records were allocated study numbers in order to maintain confidentiality. Information was stored on a password protected computer to which only the principal investigator had access.

CHAPTER 5

5. RESULTS

5.1 Study sample and incidence

During the 20-year study period (1997-2016), a total of 23 884 oral pathology cases were diagnosed as Head and Neck Pathology in the Department of Oral Pathology. Of these cases, 1 275 patients (5.34%) were diagnosed with SGTs and 553 patients were diagnosed with minor SGTs (2.31%) (Table 2). During data preparation, it was discovered that twenty-eight patient files had incomplete data and so these files were omitted from the dataset resulting in a final study sample of 1247 patients.

Table 2: Number and percentage of minor SGTs per annum from 1997-2016

Year	Overall Oral Pathology Diagnoses (*n*)	Minor SGTs	
		n	**%**
1997	636	27	4.24
1998	442	15	3.39
1999	1066	24	2.25
2000	1134	26	2.29
2001	1184	25	2.11
2002	1382	29	2.09
2003	1477	30	2.03
2004	1380	33	2.39
2005	1294	34	2.62
2006	1086	28	2.58
2007	1004	24	2.39
2008	1124	22	1.95
2009	1618	40	2.47
2010	1471	23	1.56
2011	1788	30	1.67
2012	1561	32	2.04
2013	1294	31	2.39
2014	812	31	3.81
2015	877	29	3.30
2016	1524	20	1.31
Total	**23884**	**553**	**2.31**

5.2 Prevalence of all SGTs

5.2.1 Prevalence of all SGTs and major SGTs

The mean number of SGTs occurring per year was 62.35. Of the total number of SGTs recorded in this study, the prevalence rate was 5.22% per year, of which 850 (68.16%) were benign and 397 (31.84%) were malignant.

When investigating tumours of the major salivary glands, the mean number of cases per year was 34.7. The prevalence of patients who were diagnosed with major SGTs was 55.65%. Of the 694 major SGTs recorded over the 20-year period, 535 (77.08%) were benign and 159 (22.91%) were malignant (Figure 1).

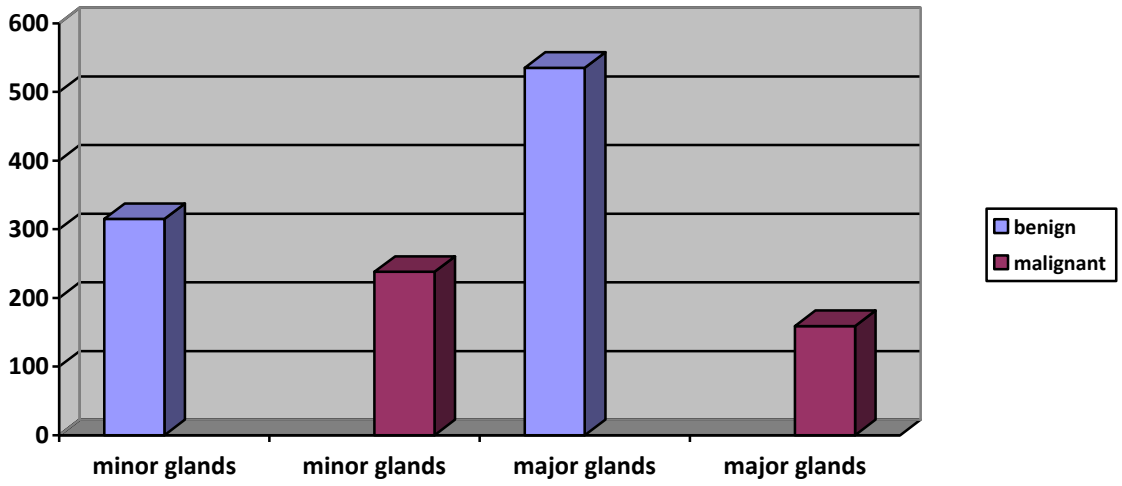


Figure 1. Incidence of benign minor SGTs and malignant minor SGTs and benign major SGTs and malignant major SGTs

5.2.2 Prevalence of minor SGTs

The prevalence of minor SGTs diagnosed in the Department of Oral Pathology between the period 1997-2016 is depicted in Figure 2. In total, over the 20-year period, there were 553 minor SGTs (2.31%) diagnosed, of which 315 (56.96%) were benign and 238 (43.03%) were malignant. The range pertaining to incidence of minor SGTs was 40 cases, which peaked in 2009.

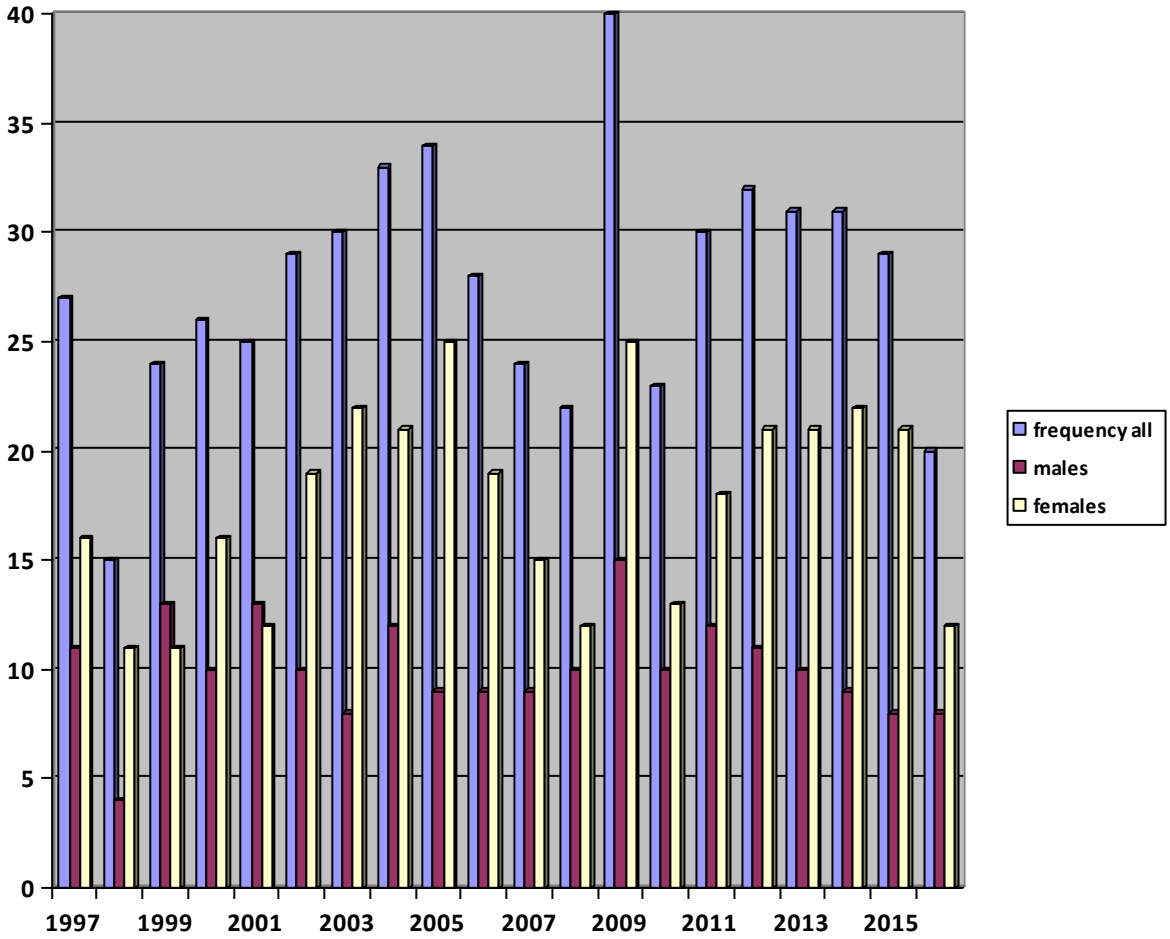


Figure 2. Annual frequency per year of minor SGTs

5.3 Demographic data for all SGTs

5.3.1 Age distribution for all SGTs

When considering all the SGTs in this study (both benign and malignant of both the major and minor glands), patients ranged in age between 8 and 98 years (43.3 ± 17.5 years; mean ± SD). Most patients were between 21-40 years of age (39%), followed by those between 41-60 years (32%). Eighteen percent of patients were between 61-80 years, and 9% were below 20 years. Only a small percentage (1%) of patients was older than 80 years (Figure 3). Age versus gender depicted no statistically significant age distribution between genders when considering the different age of patients for all SGTs.

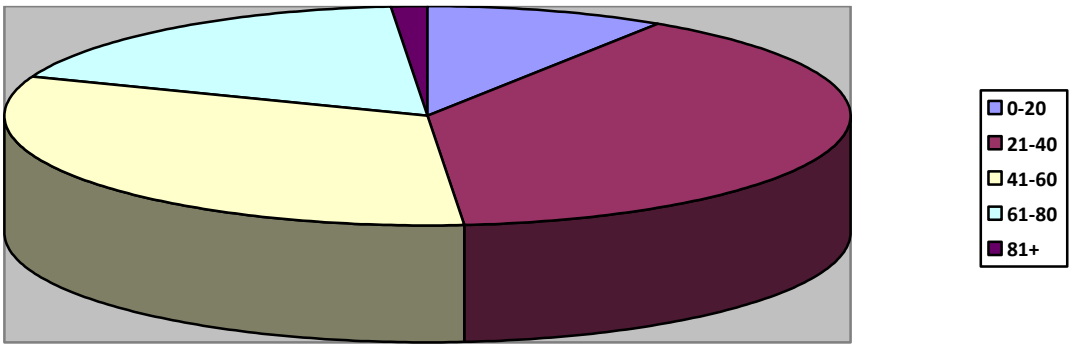


Figure 3. Frequency of age groups for all SGTs

There was no statistically significant age distribution between genders when considering the different age of patients for all SGTs (Figure 4).

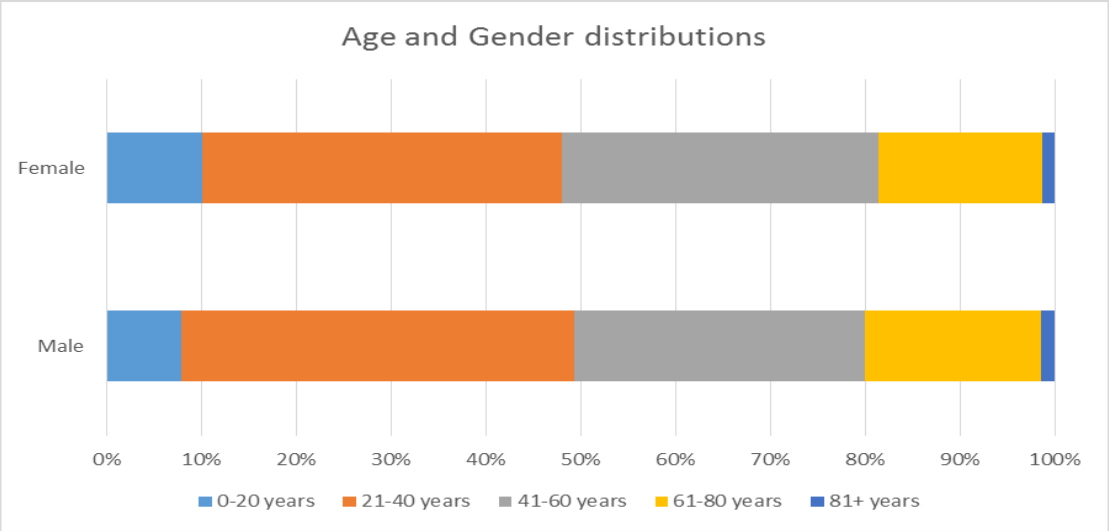


Figure 4. Age versus gender for all SGTs

5.3.2 Age distribution for major SGTs

When considering all the major SGTs in this study (both benign and malignant), the age range of patients was between 8 and 98 years (42.7 ± 17.1 years; mean ± SD). In terms of the age distribution, most patients with major SGTs were between 21-40 years of age (41.50%), followed by those between 41-60 years (32%). Sixteen percent of patients were between 61-80 years, and 9% were below 20 years. Only a small percentage (1%) of patients was older than 80 years.

There was no statistically significant difference in the age between male (42.98 ± 17.3 years; mean ± SD) and female (42.56 ± 17.11 years; mean ± SD) patients with major SGTs (p=0.75).

However, a statistically significant difference in the age for patients was evident with benign (41.80 ± 16.61 years; mean ± SD) and malignant (45.91 ± 18.69 years; mean ± SD) major SGTs (p=0.00).

5.3.3 Age distribution for minor SGTs

Minor SGTs occurred in patients between the ages of 9 and 93 years (44.1 ± 17.8 years; mean ± SD) (Figure 5; Figure 6). There was no statistically significant difference in the age between male (44.56 ± 17.73 years; mean ± SD) and female (43.82± 17.98 years; mean ± SD) patients with minor SGTs (p=0.64).

However, a statistically significant difference in the age for patients was evident with benign (39.76 ± 17.46 years; mean ± SD) and malignant (49.81 ± 16.68 years; mean ± SD) minor SGTs (p=0.00).

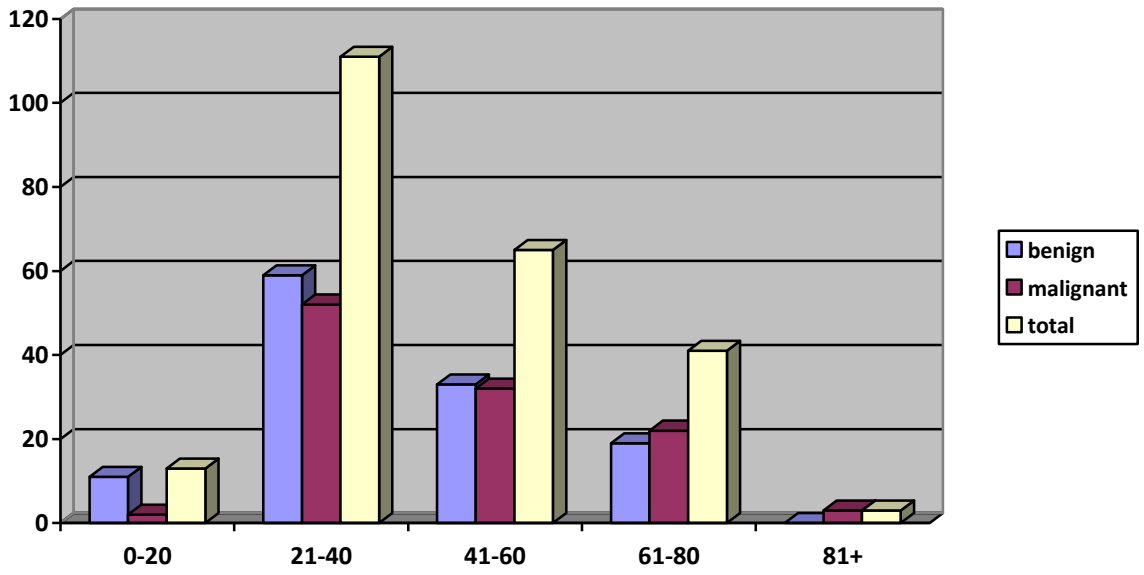


Figure 5. Age in years of male patients with minor SGTs

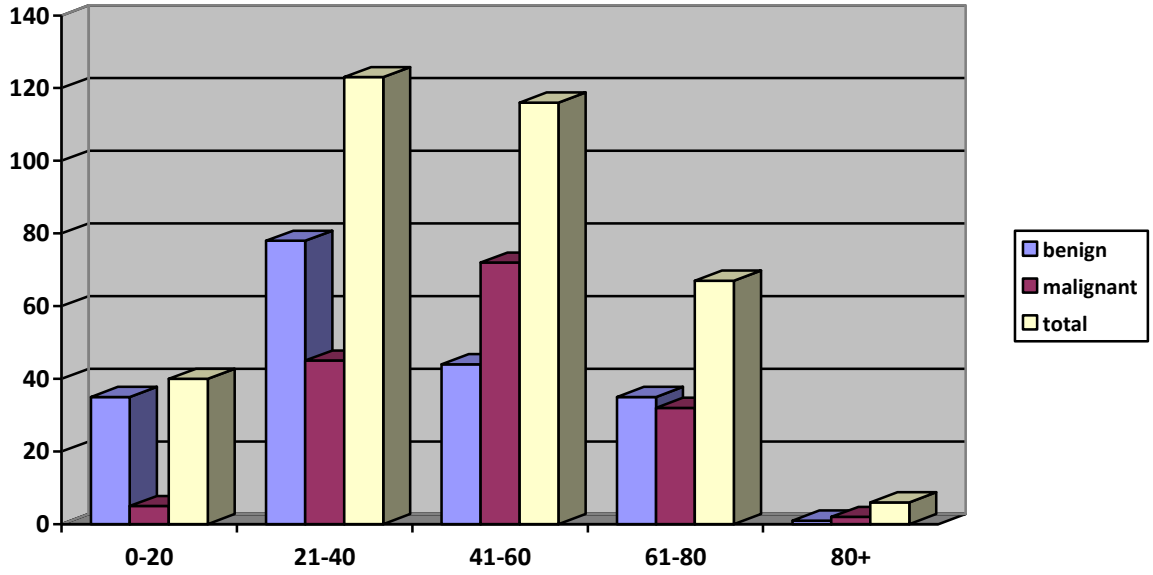


Figure 6. Age in years of females with minor SGTs

The association between the age and behavioural type of minor SGTs (benign versus malignant) was significant for both females and males respectively, (p<0.05). Across both genders, malignant tumours occurred in older patients.

5.4 Gender

5.4.1 Gender distribution for all SGTs and major SGTs

There was a higher preponderance for female patients versus male patients for both minor and major SGTs (Figure 7). Overall, malignant SGTs were more common in females (benign:malignant = 1:2.17) than males (benign:malignant = 1:2.12), however, these differences were not statistically significant (p=0.85).

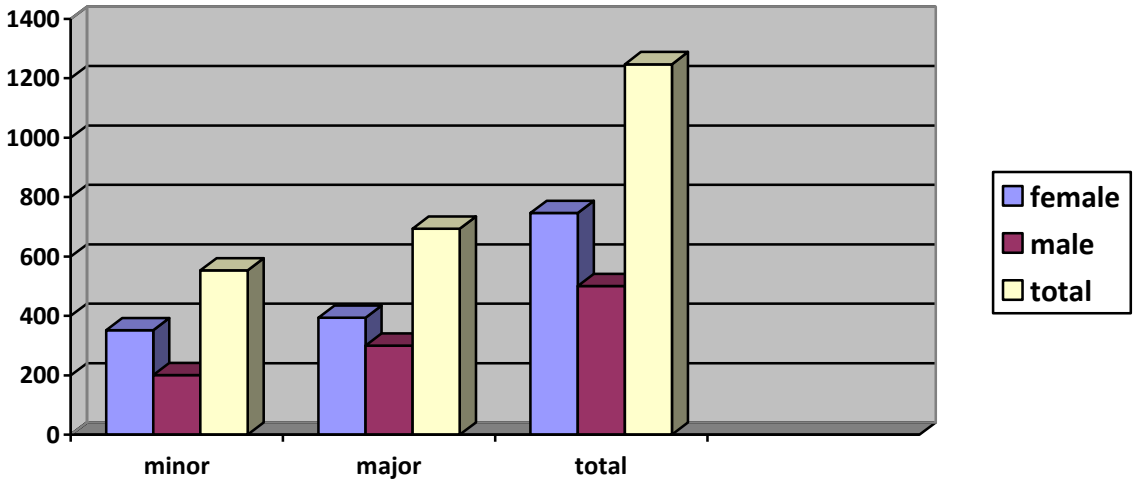


Figure 7. Gender distribution for minor SGTs, major SGTs and all SGTs

5.4.2 Gender distribution for minor SGTs

There were 193 (54.8%) benign and 159 (45.2%) malignant minor SGTs in females and 122 (60.7%) benign and 79 (39.3%) malignant minor SGTs in males (Figure 8). However, the differences pertaining to gender were not statistically significant (p=0.18), despite there being a larger proportion of females than males with minor SGTs in this study.

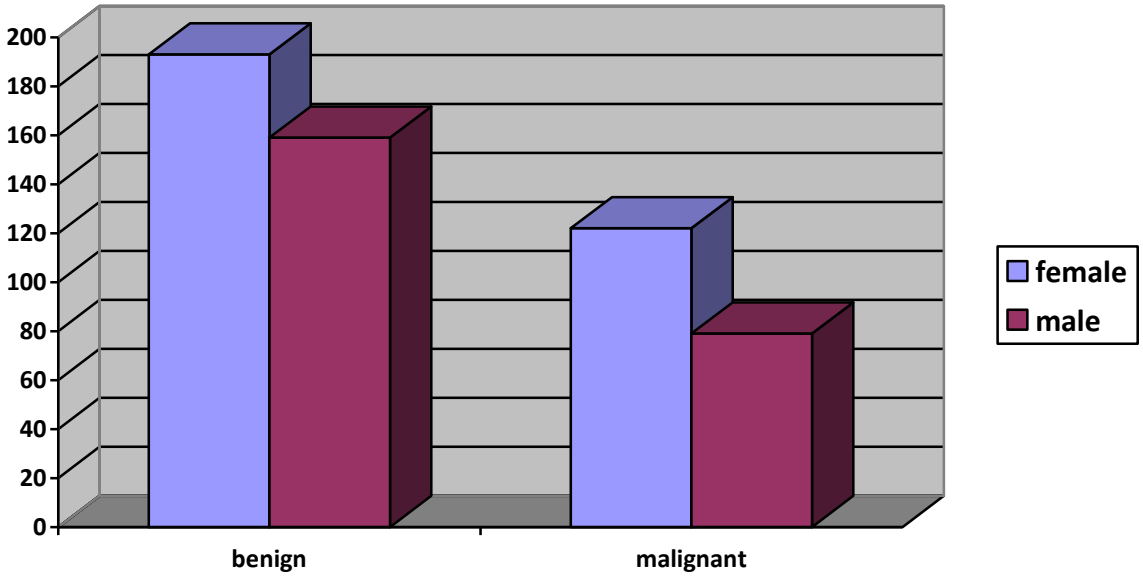


Figure 8. Gender distribution for minor SGTs

5.5 Types of SGTs

5.5.1 Histologic types of all SGTs and of the major SGTs

The three most common histologic types of all SGTs were

- Pleomorphic adenoma (*n*= 796; 63.83%)
- Mucoepidermoid carcinoma (*n*=100; 8.01%)
- Adenoid cystic carcinoma (*n*=86; 6.89%)

The three most common histologic types of major SGTs (Figure 9) were:

- Pleomorphic adenoma (*n*= 510; 73%)
- Mucoepidermoid carcinoma (*n*=46; 6.6%)
- Adenoid cystic carcinoma (*n*=32; 4.6%)

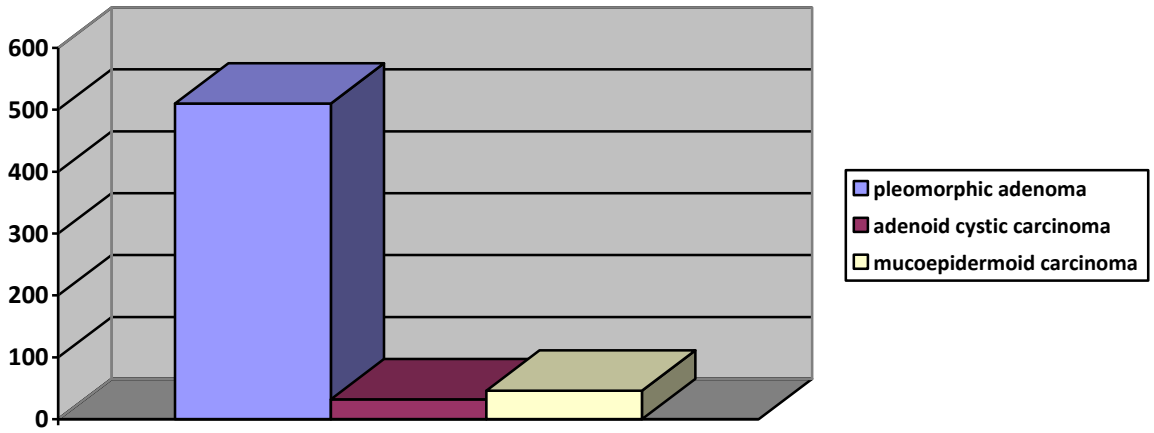


Figure 9. Most common major SGT histological types

5.5.2 Histologic types of SGTs in the minor glands

The three most common histologic types of minor SGTs (Figure 10) were:

- Pleomorphic adenoma (*n*=286; 51.72%)
- Adenoid cystic carcinoma (*n*=68; 12.3%)
- Mucoepidermoid carcinoma (*n*=54; 9.8%)

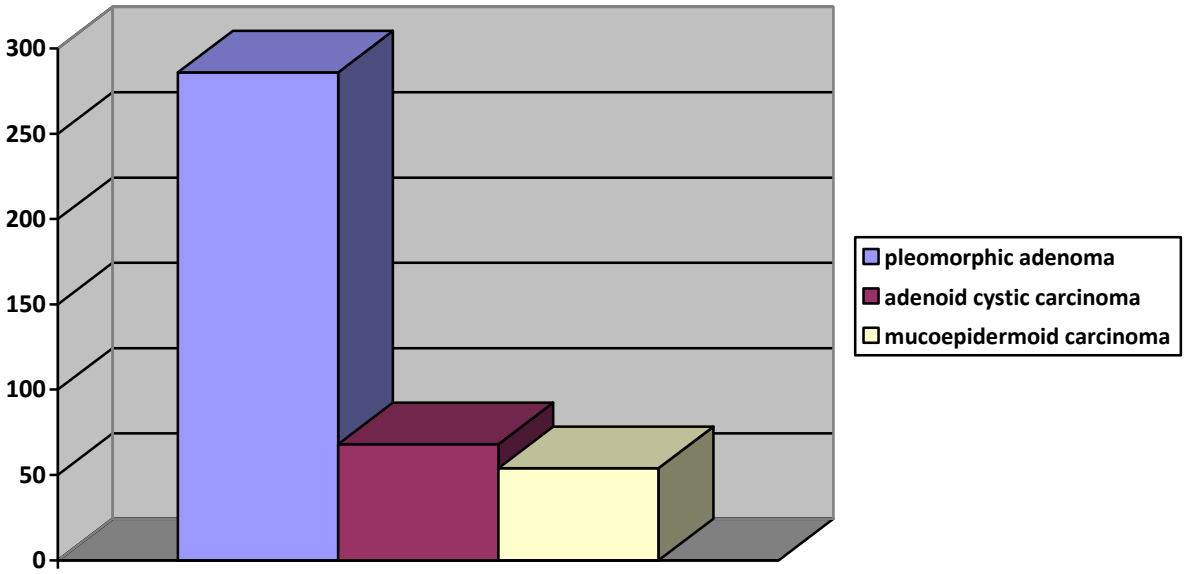


Figure 10. Most common minor SGT histological types

5.5.3 Histologic types of SGTs in the minor glands in males

The three most common histologic types of minor SGTs in males (Figure 11) were:

- Pleomorphic adenoma (*n*=114; 47.89%)
- Adenoid cystic carcinoma (*n*=21; 8.82%)
- Mucoepidermoid carcinoma (*n*=18; 7.56%)

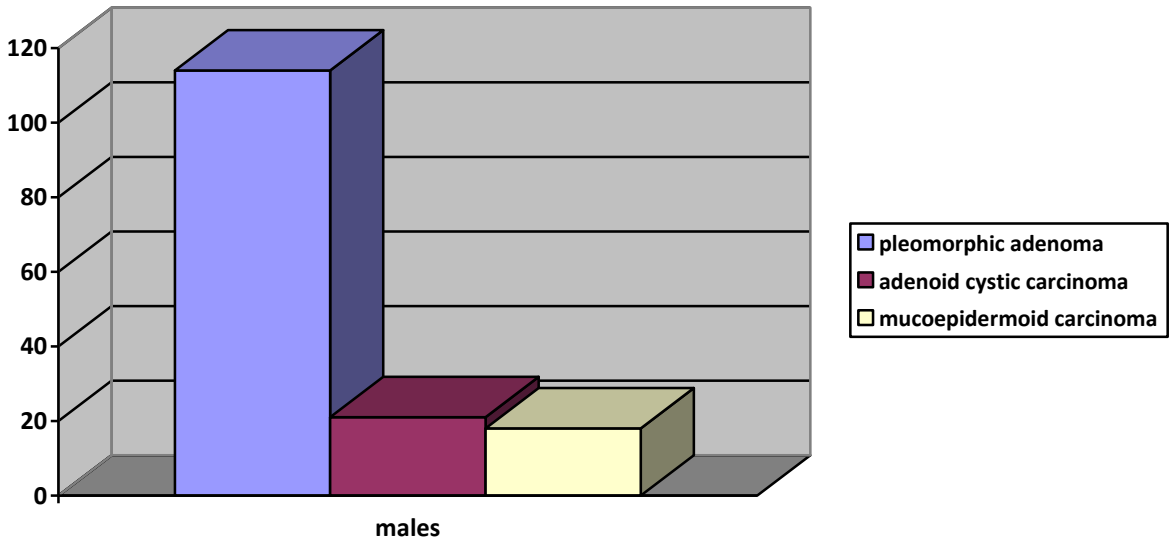


Figure 11. Distribution of minor SGTs in males

5.5.4 Histologic types of SGTs in the minor glands in females

The three most common histologic types of minor SGTs in females (Figure 12) were:

- Pleomorphic adenoma (*n*=172; 54.60%)
- Adenoid cystic carcinoma (*n*=47; 14.92%)
- Mucoepidermoid carcinoma (*n*=37; 11.74%)

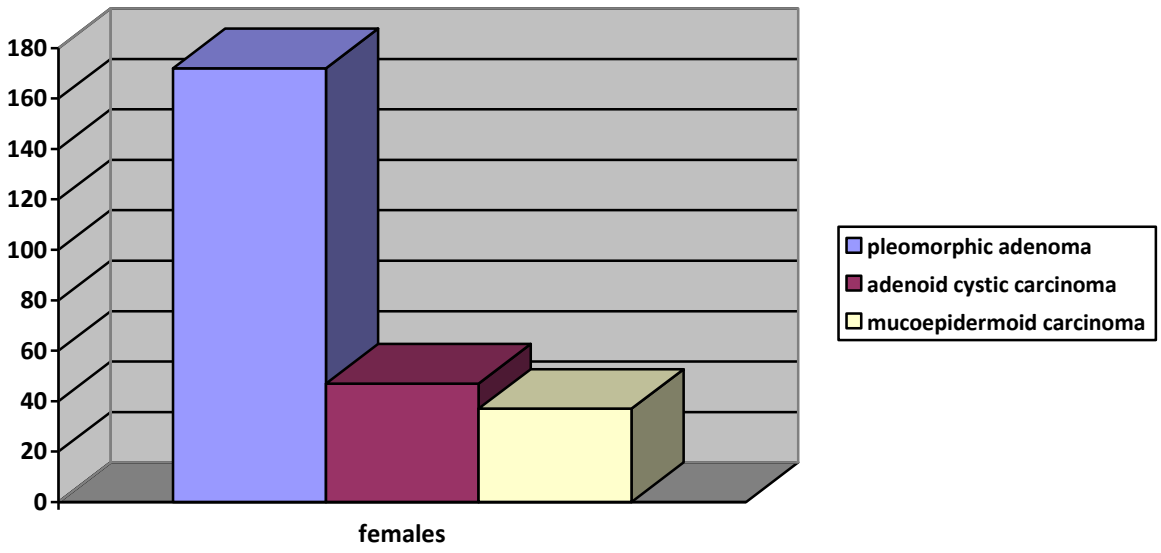


Figure 12. Distribution of minor SGTs in females

5.6 Benign versus malignant tumours

5.6.1 The ratio of benign versus malignant SGTs for the overall population and in the major salivary glands

The ratio of benign to malignant tumours in the overall patient population for both benign and malignant SGTs is highlighted in Figure 13.

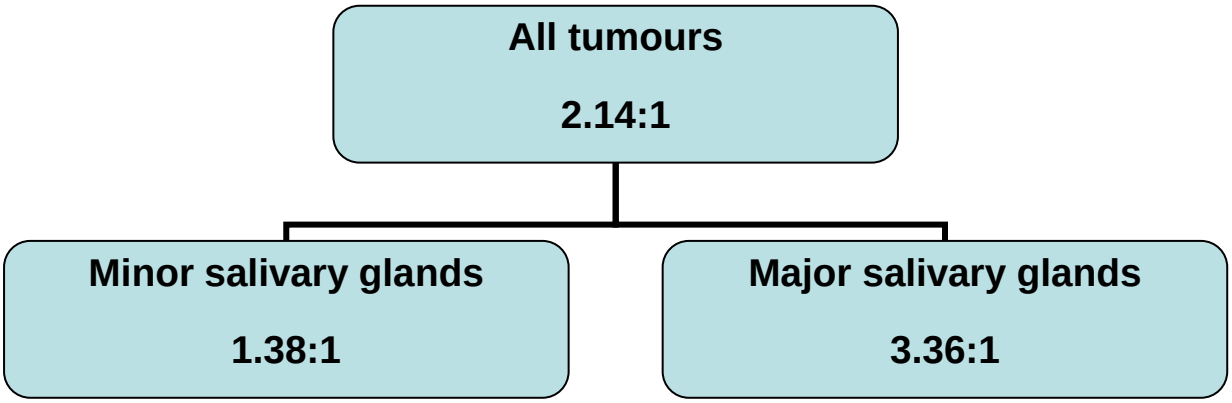


Figure 13. Ratio of benign versus malignant SGTS for all tumours (minor and major SGTs)

The ratio of benign to malignant major SGTs in males and females is depicted in Figure 14. For major SGTs the ratio of benign versus malignant was higher in females than males; male patients were more likely to have malignant tumours than females.

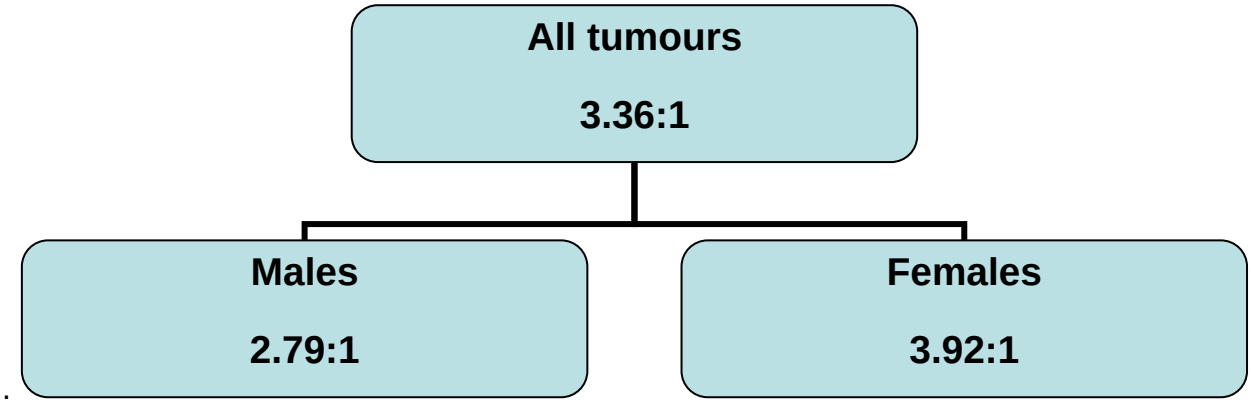


Figure 14. Gender ratio for major SGTs

5.6.2 The ratio of benign versus malignant tumours for minor SGTs

For minor SGTs the ratio of benign versus malignant was higher in males than females; and female patients were more likely to have malignant tumours than males (Figure 15).

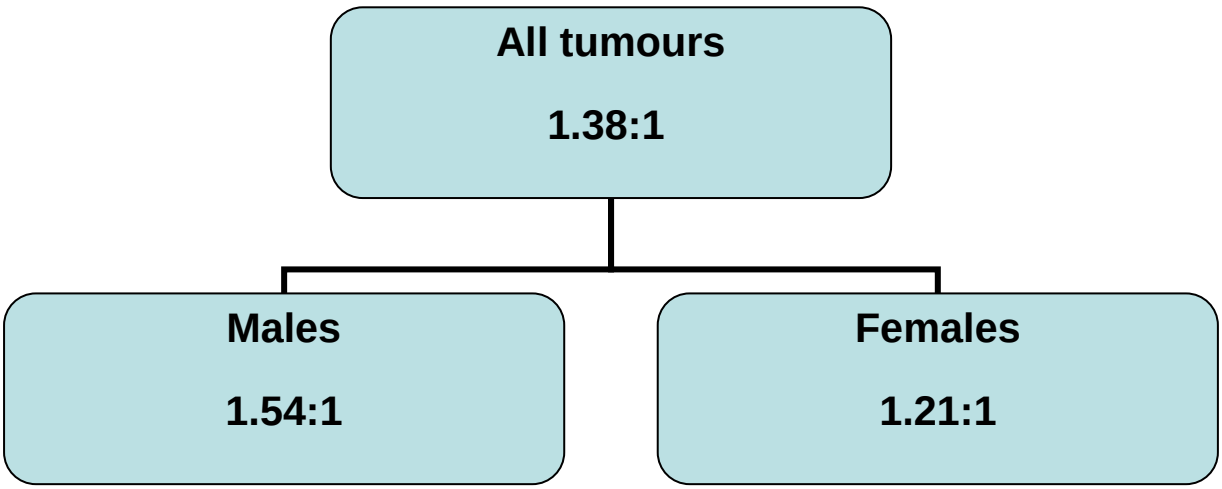


Figure 15. Ratio of benign versus malignant for males and females in minor SGTs

5.7 Site of minor SGTs

The most common site for minor SGTs was the palate (56%) followed by the cheek (11.2%), the lip (8.9%) and paranasal sinuses (7.4%) (Figure 16). Minor SGT occurrence for both genders was established within the hard palate, soft palate, palate (NOS) and "other" sites (inclusion of all the other sites). The anatomical distribution of the various histologic types at various anatomic sites is listed in Table 3.

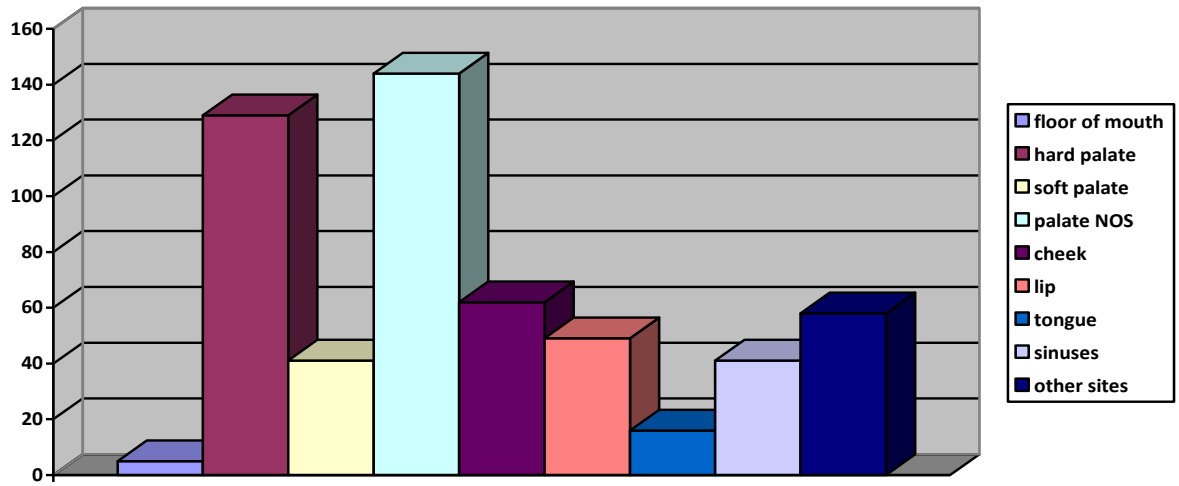


Figure 16. Anatomical distribution of minor SGTs

Table 3. Anatomical distribution and histology of minor SGTs

Histologic type	FOM	Hard Palate	Soft palate	Palate (NOS)	Cheek	Lip	Tongue	Sinuses	Other	Total
Pleomorphic adenoma	0	78	25	93	19	28	1	9	34	**287**
Myoepithelioma	0	3	2	3	1	2	0	1	1	**13**
Basal cell adenoma	0	0	0	0	0	0	0	0	0	**0**
Warthin tumour	0	0	0	0	0	0	0	0	0	**0**
Oncocytoma	0	0	0	0	0	0	0	0	0	**0**
Canalicular adenoma	0	1	1	0	2	7	0	0	0	**11**
Sebaceous adenoma	0	0	0	0	0	0	0	0	0	**0**
Lymphadenoma	0	0	0	0	0	0	0	0	0	**0**
Ductal papillomas	0	0	0	0	0	0	0	0	0	**0**
Cystadenoma	0	0	0	1	0	0	0	0	2	**3**
Acinic cell carcinoma	0	0	0	0	9	5	1	0	1	**16**
Mucoepidermoid carcinoma	0	10	3	16	10	0	8	3	8	**58**
Adenoid Cystic carcinoma	3	18	4	13	3	2	4	15	9	**71**
PLGA	0	13	3	9	12	4	1	6	4	**52**
Epithelial-myoepithelial carcinoma	0	0	0	0	0	0	0	0	1	**1**
Clear cell carcinoma (NOS)	0	0	0	0	0	0	0	0	0	**0**
Basal cell adenocarcinoma	0	0	0	1	0	0	0	0	0	**1**
Sebaceous carcinoma	0	0	0	0	0	0	0	0	0	**0**
Sebaceous lymphadenocarcinoma	0	0	0	0	0	0	0	0	0	**0**
Cystadenocarcinoma	0	0	0	0	0	0	0	0	0	**0**
Low-grade cribriform cystadenocarcinoma	0	0	0	0	0	0	0	0	0	**0**
Mucinous adenocarcinoma	0	0	0	0	0	0	0	0	0	**0**
Oncocytic carcinoma	0	0	0	0	0	0	0	0	0	**0**
Salivary duct carcinoma	0	0	0	0	0	0	0	1	0	**1**
Adenocarcinoma (NOS)	1	3	1	4	3	1	0	2	4	**19**
Myoepithelial carcinoma	0	2	0	1	0	0	1	4	0	**8**
Carcinoma ex pleomorphic adenoma	0	1	2	4	2	0	0	0	3	**12**
Carcinosarcoma	0	0	0	0	0	0	0	0	0	**0**
Metastasising pleomorphic adenoma	0	0	0	0	0	0	0	0	0	**0**
Squamous cell carcinoma	0	0	0	0	0	0	0	0	0	**0**
Small cell carcinoma	0	0	0	0	0	0	0	0	0	**0**
Large cell carcinoma	0	0	0	0	0	0	0	0	0	**0**
Lymphoepithelial carcinoma	0	0	0	0	0	0	0	0	0	**0**
Sialoblastoma	0	0	0	0	0	0	0	0	0	**0**
Total	**4**	**129**	**41**	**144**	**62**	**49**	**16**	**41**	**67**	**553**

5.7.1 Gender (male) distribution of minor SGTs in the hard palate

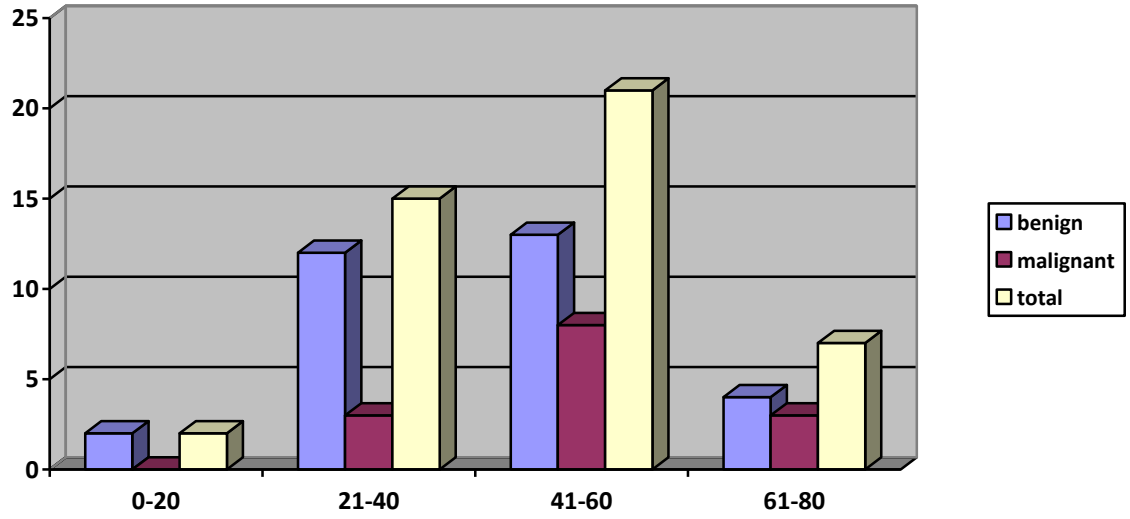


Figure 17. Association between age and benign/malignant tumours in the hard palate in males

The association between age and benign/malignant tumours in the hard palate for men was not significant, p =0.441 (Figure 17). Benign tumours were more prevalent overall (68.89%). Most SGTs, both benign and malignant tumours occurred in the 41-60 year age group. The three most common minor SGT types in males in the hard palate are depicted in Table 4.

Table 4. The three most common minor SGT types in males in the hard palate

	Benign (*n*=31)	Malignant (*n*=14)
Pleomorphic adenoma	30	0
Adenoid Cystic carcinoma	0	6
PLGA	0	4

5.7.2 Gender (female) distribution of minor SGTs in the hard palate

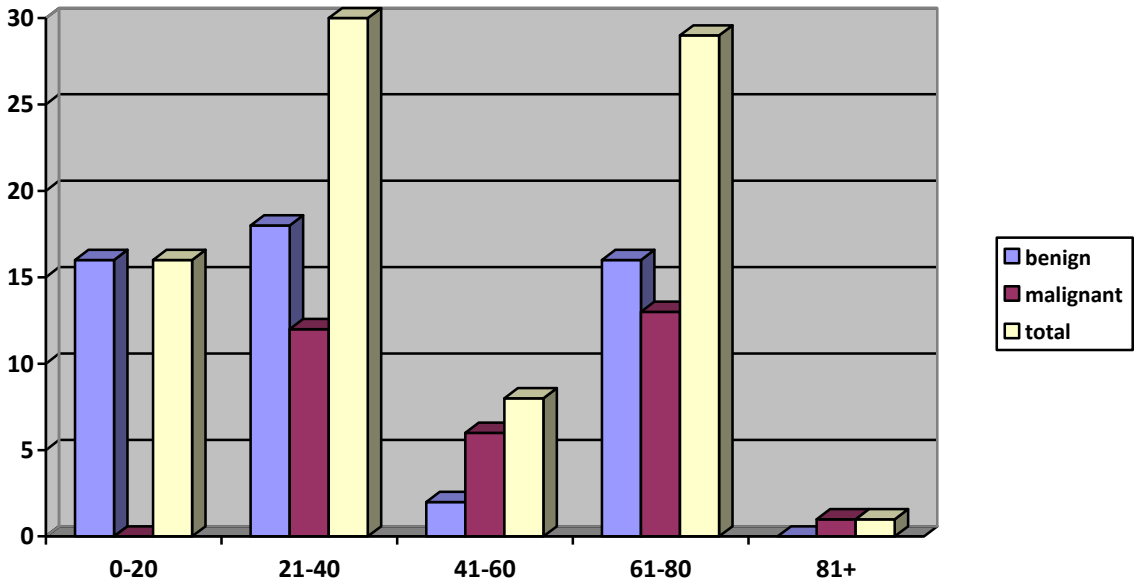


Figure 18. Association between age and benign/malignant tumours in the hard palate in females

The association between age and benign/malignant tumours in the hard palate for women was significant, $p<0.05$ (Figure 18). Benign tumours were more prevalent overall (61.90%), and were more common in the 0-20 year age group. The three most common minor SGT types for females in the hard palate are depicted in Table 5.

Table 5. The three most common minor SGT types in females in the hard palate

	Benign (*n*=52)	Malignant (*n*=32)
Pleomorphic adenoma	48	0
Adenoid Cystic carcinoma	0	10
Mucoepidermoid carcinoma	0	8

5.7.3 Gender (male) distribution of minor SGTs in the soft palate

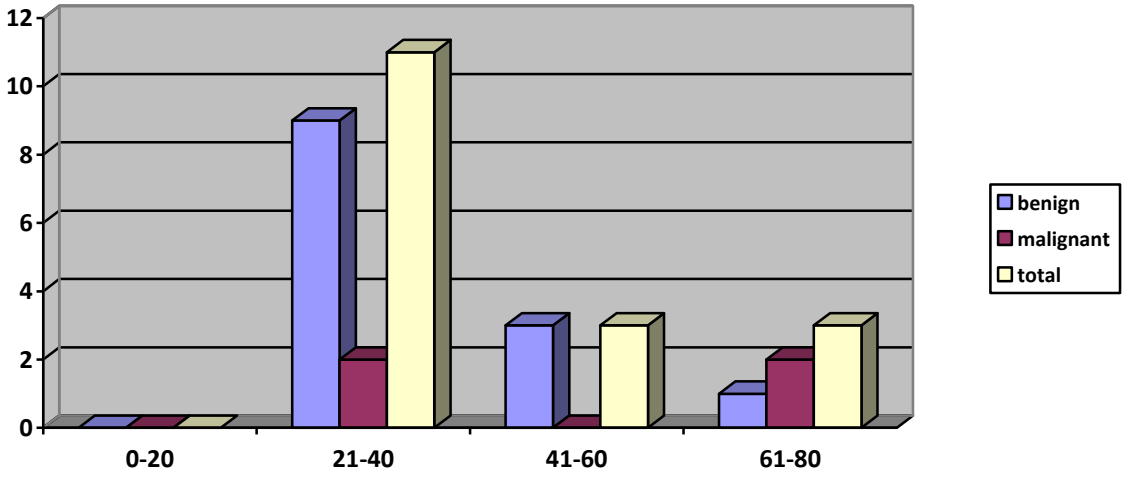


Figure 19. Association between age and benign/malignant tumours in the soft palate in males

The association between age and benign/malignant tumours in the soft palate for men was not significant, p=0.122 (Figure 19). Benign tumours were more prevalent overall (76.47%). Most cases occurred in the 21-60 year age group and were benign, whereas more cases in the 61-80 year age group were malignant. There were no SGTs in the soft palate in the 0-20 year age group in males. The three most common minor SGT types in males in the soft palate are depicted in Table 6.

Table 6. The three most common minor SGT types in males in the soft palate

	Benign (n=13)	Malignant (n=4)
Pleomorphic adenoma	13	0
Adenoid Cystic carcinoma	0	2
PLGA	0	1

5.7.4 Gender (female) distribution of minor SGTs in the soft palate

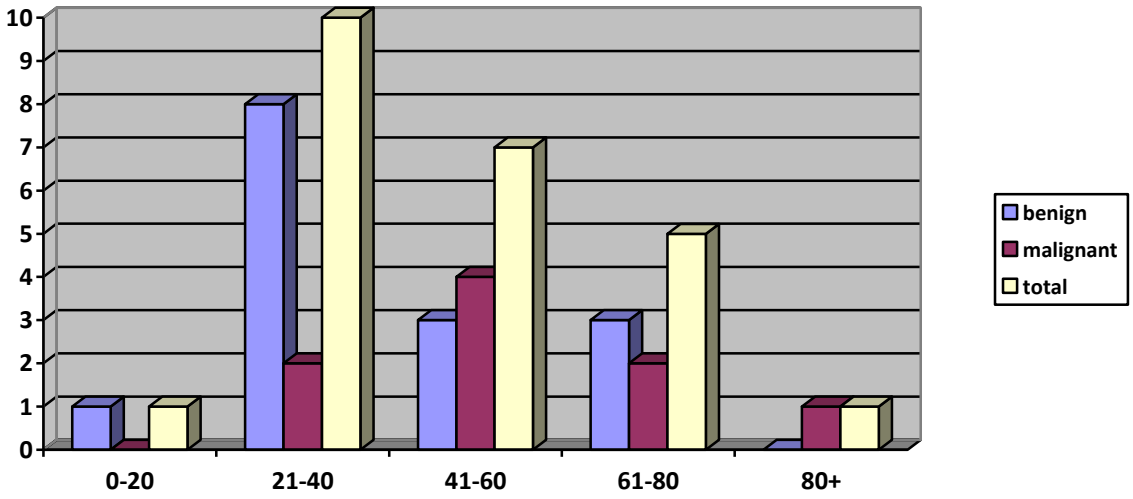


Figure 20. Association between age and benign/malignant tumours in the soft palate in females

The association between age and benign/malignant tumours in the soft palate for women was not significant, p=0.315 (Figure 20). Benign tumours were more prevalent overall (62.50%). Most tumours occurred in the 21-40 year age group and most were benign in that age group, whereas tumours in age group 41-80+ years were more likely malignant. The most common minor SGT types in females in the soft palate are depicted in Table 7.

Table 7. The most common minor SGT types in females in the soft palate

	Benign (n=15)	Malignant (n=9)
Pleomorphic adenoma	12	0
Mucoepidermoid carcinoma	0	3
PLGA	0	2
Adenoid Cystic carcinoma	0	2

5.7.5 Gender (male) distribution of minor SGTs in the palate (NOS)

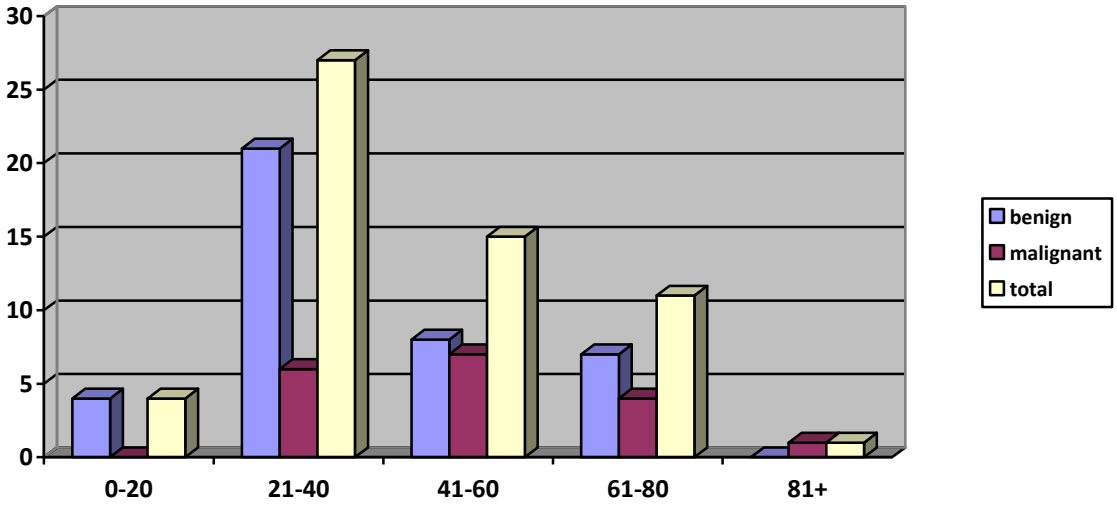


Figure 21. Association between age and benign/malignant tumours in the palate (NOS) for males

The association between age and benign/malignant tumours in the palate (unspecified) for men was not significant, p=0.143 (Figure 21). Benign tumours were more prevalent overall (68.96%). Most tumours occurred in the 21-40 age group and most were benign. The three most common minor SGT types in males in the palate (NOS) are depicted in Table 8.

Table 8. The three most common minor SGT types in males in the palate (NOS)

	Benign (n=40)	Malignant (n=18)
Pleomorphic adenoma	39	0
Mucoepidermoid carcinoma	0	5
Adenoid Cystic carcinoma	0	4

5.7.6 Gender (female) distribution of minor SGTs in the palate (NOS)

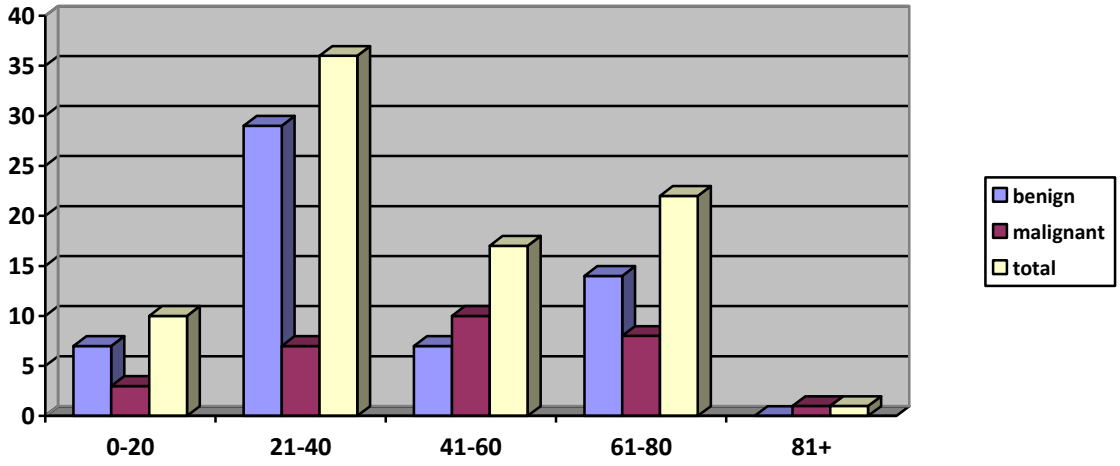


Figure 22. Association between age and benign/malignant tumours in the palate (NOS) for females

The association between age and benign/malignant tumours in the palate (NOS) for women was significant, $p<0.05$ (Figure 22). Benign tumours were more prevalent overall (66.27%). Most tumours in the 0-40 year age group were benign whereas more tumours in the 41-81+ age group were malignant. The three most common minor SGT types in females in the palate (NOS) are depicted in Table 9.

Table 9. The three most common minor SGT types in females in the palate (NOS)

	Benign (*n*=57)	Malignant (*n*=29)
Pleomorphic adenoma	54	0
Mucoepidermoid carcinoma	0	10
Adenoid Cystic carcinoma	0	9

5.7.7 Gender (male) distribution of minor SGTs in other sites

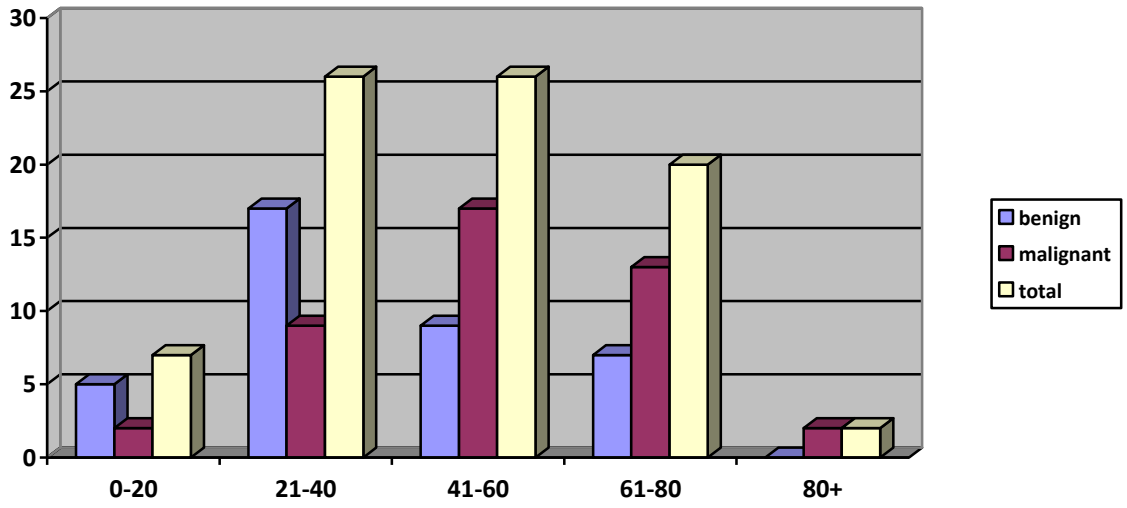


Figure 23. Association between age and benign/malignant tumours in other minor salivary glands in males

The association between age and benign/malignant tumours in the other minor salivary glands for men was significant, $p<0.05$ (Figure 23). Malignant tumours were more prevalent overall (53.08%). Most tumours in the age group 0-40 years were benign, whereas tumours in the 41-80+ age group were more likely to be malignant. The three most common minor SGT types in males in other sites are depicted in Table 10.

Table 10. The three most common minor SGT types in males in other sites

	Benign (*n*=38)	Malignant (*n*=43)
Pleomorphic adenoma	32	0
Mucoepidermoid carcinoma	0	10
Adenoid Cystic carcinoma	0	9

5.7.8 Gender (female) distribution of minor SGTs in other sites

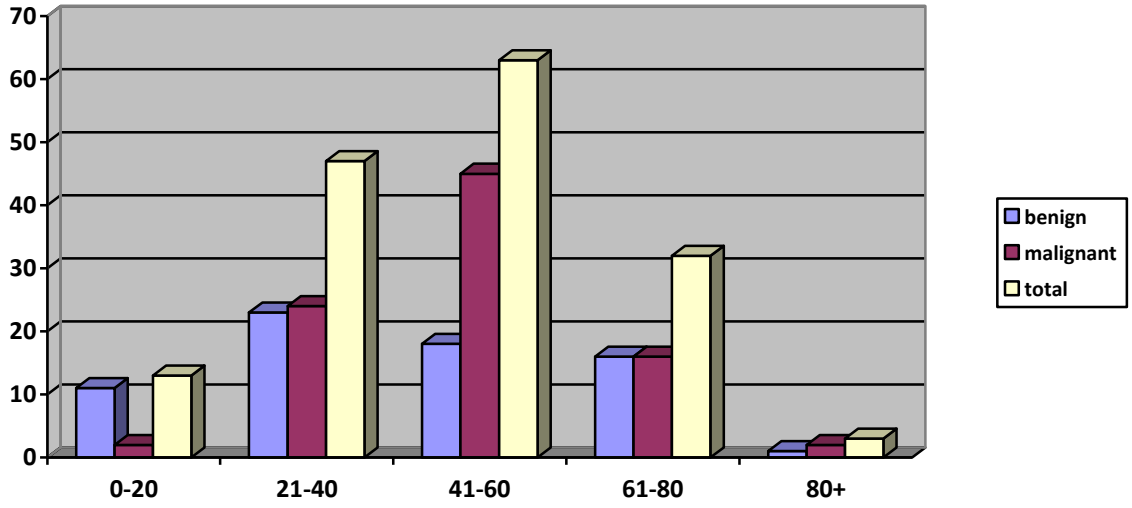


Figure 24. Association between age and benign/malignant tumours in other minor salivary glands in females

The association between age and benign/malignant tumours in the other minor salivary glands for women was significant, $p<0.05$ (Figure 24). Malignant tumours were more prevalent overall (56.32%). More tumours in the age groups 21-60 and 80+ were malignant. The three most common minor SGT types in females in other sites are depicted in Table 11.

Table 11. The three most common minor SGT types in females in other sites

	Benign (*n*=58)	Malignant (*n*=89)
Pleomorphic adenoma	58	0
Adenoid Cystic carcinoma	0	27
PLGA	0	21

CHAPTER 6

6. DISCUSSION

6.1 Prevalence and incidence over the 20-year period

A total of 553 minor SGTs were included in this 20-year study. This study showed no overall increase in the number of minor SGTs diagnosed per year. The mean number of minor SGTs was 27.7, with the highest peak prevalence (*n*=40) observed in 2009.

In fact, there was a decrease in the prevalence rates of minor SGTs seen in the Department of Oral Pathology over the last 5 years (2011- 2016) in comparison to South African and African studies, which showed the mean number of cases per year to be 8.75, 6.08 and 7.16 respectively (Van Heerden & Raubenheimer, 1991; Gbotolorun., 2008; Lawal et al., 2015). Thus even though there is a decrease in the number of cases diagnosed per year since 2009, there is still a higher number of cases of minor SGTs currently being diagnosed.

The Chinese studies by Wang et al. (2007) with 52 cases per year and by Shen et al. (2018) with 42 cases per year showed much higher means per year as compared to our study. Asian studies showed trends lower than our studies, ranging from 18-21 cases per year (Toida et al., 2004; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Tilakaratne et al., 2009) and studies from Europe and the Americas showed a much lower prevalence ranging from 2.42–8.5 cases per year (Jansisyanont, Blanchaert & Ord, 2002; Loyola et al., 1995; Lukšić et al., 2012; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016), except for the Californian study by Buchner, Merrell & Carpenter (2007), which showed an average of 19 cases per year. Most studies revealed a lower prevalence of minor SGTs besides studies from China by Wang et al. (2007) and Shen et al. (2018), followed by our study.

The incidence rate of minor SGTs over the 20-year period of all the cases diagnosed at our institution was 2.31%. When comparing incidence rates per year, the highest incidence was in 1997 (4.24%), followed by 2014 (3.81%), 1998 (3.39%) and 2015

(3.30%). Studies by Taghavi et al. (2016), Buchner, Merrell & Carpenter (2007) and Rivera-Bastidas, Ocanto, Acevedo (1996) showed much lower incidence rates of 0.3%, 0.4% and 0.7% respectively. Most other studies did not include the incidence of minor SGTs or the total number of cases seen. Some studies included both major and minor SGTs making comparisons difficult. The reason for an unusually high incidence rate in our institution remains to be defined.

There is great variability in published literature in terms of minor and major SGTs. However, the increased incidence of malignant minor SGTs may be due to referral systems. A possible explanation given is the fact that most patients undergoing biopsies for head and neck and oral pathology are referred to specialised oral and maxillofacial diagnostic centres resulting in a biased representation of the pathology actually represented in that particular region or country (Wang et al., 2007; Shen et al., 2018). Another probability is the 'harvesting effect' suggested by Jansisyanont, Blanchaert & Ord (2002), which refers to the management of benign tumours by the oral and maxillofacial surgeons themselves, with referral of patients with malignant minor SGTs to specialised academic institutions.

Global reports are unanimous in their findings of SGTs being more common in the major salivary glands. Likewise, our study concurs with this in that 55.65% were tumours of the major salivary glands and 44.34% tumours of the minor salivary glands (Taghavi et al. 2016; Tilakaratne et al. 2009; Lawal et al., 2015; Lukšić et al., 2012; Chidzonga, Lopez Perez & Portilla-Alvarez, 1995; Vuhahula, 2004; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013). Compared to our study (44.3%), studies from China (16.9%) (Shen et al., 2018), Croatia (27.2%) (Lukšić et al., 2012) and Pakistan (28.5%) (Rahman et al., 2008) showed a much lower percentage of SGTs occurring in the minor salivary glands.

6.2 Age distribution of SGTs

There was a wide age distribution of all the SGTs in the population sampled. Patients ranged in age from 8 to 98 years with a mean age of 43 years. Most patients with SGTs however were between 21-60 years of age (71%).

Malignant tumours were more uncommon than benign tumours in younger patients. There was a statistically significant difference in the mean age of malignant SGTs (48 years) versus benign SGTs (41 years) of both major and minor glands collectively (p=0.00).

6.2.1 Age distribution for minor SGTs

Minor SGTs occurred in patients between the ages of 9 and 93 years, with a mean age of 44 years. There was no statistically significant difference in the age between male (45 years) and female (44 years) patients when considering minor SGTs only (p=0.64).

A statistically significant difference however was noted in age for patients with benign minor SGTs (40 years) when compared to malignant minor SGTs (50 years) (p=0.00). The association between the age and whether the minor SGTs were benign or malignant was statistically significant for both females and males respectively (p<0.05). Benign tumours occurred at a younger age for both males and females Malignant SGTs were very uncommon in patients under 20 years of age for both sexes.

6.2.1.1 *South African studies*

As compared to the South African study by Isaacson and Shear (1983), the mean age for males was 37 years and for females was 41 years, which was significantly lower than our study. Benign SGTs too presented at a younger age when compared to malignant tumours. Another South African study by Van Heerden & Raubenheimer (1991) had similar findings with benign tumours occurring in a younger age group but no gender differentiation was made.

6.2.1.2 *African studies*

A Nigerian study by Lawal et al., (2015) concurred with our study in terms of mean ages for both sexes for malignant SGTs. Similar to our study, a report from Nigeria by Gbotolorun et al. (2008) showed benign SGTs presenting at an earlier age, but found the mean age for both males and females for benign (33 years) and malignant (41 years) tumours to be much lower than our study.

6.2.1.3 *Asian, American and European studies*

Contrary to most studies, the American report by Jansisyanont, Blanchaert & Ord (2002) showed malignant SGTs presenting much earlier than benign tumours by an average of 6 years earlier. However, most international studies agree that the mean age of presentation for benign minor SGTs is significantly lower than that of malignant minor SGTs (Toida et al., 2004; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Loyola et al., 1995; Wang et al., 2007; Lukšić et al., 2012; Rahman et al., 2008; Buchner et al., 2007; Barros et al., 2010; Sarmento et al., 2016; Taghavi et al., 2017).

6.3 Gender distribution

In this study of minor SGTs, 63.6% were females (*n*=352) and 36.6% (*n*=201) males. Most studies however show minor SGTs to have a higher predilection for females (Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Chidzonga, Lopez Perez & Portilla-Alvarez, 1995; Vuhahula, 2004; Wang et al., 2007; Toida et al., 2006; Tilakaratne et al., 2009; Loyola et al., 1995; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016; Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007).

The ratio of benign to malignant SGTs in females was 1.21:1 and in males 1.54:1. Thus, female patients appeared more likely to have malignant tumours than males. Furthermore, middle-aged females, in the 40-61 year age group had a higher percentage of malignant tumours compared to all other age groups. For major SGTs, the inverse was true in that male patients seemed more likely to develop malignant tumours than females. Of all the SGTs (*n*=1247) in this study, 59.6% (*n*=758) occurred in females and 41.4% (*n*=512) in males.

6.3.1 South African studies

The findings of the South African studies by Isacsson & Shear (1983) and Van Heerden & Raubenheimer (1991) were similar in terms of gender distribution for minor SGTs in females (56% and 62% respectively) and males (44% and 38% respectively).

6.3.2 African studies

Most African studies concur that there is a higher predilection of minor SGTs in females than males. This was corroborated by the Zimbabwean (Chidzonga, Lopez

Perez & Portilla-Alvarez, 1995) and Ugandan (Vuhahula, 2004) studies, which showed minor SGT involvement in 55.67% and 56.7% of females respectively and in 44.32% and 43.3% of males respectively. The Nigerian study (Gbotolorun et al., 2008) however showed minor SGTs to have an equal gender predilection.

6.3.3 Asian studies

The Asian reports (Wang et al., 2007; Toida et al., 2006; Tilakaratne et al., 2009) also showed a higher female predilection, but the study by Shen et al. (2018) revealed a slightly higher male predilection for SGTs (50.6%).

6.3.4 American and European studies

There was a higher female preponderance in the South American studies (Loyola et al., 1995; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016), as well as in both the American studies (Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007) , which is in keeping with most published series. On the other hand, the study in England by Strick et al. (2004) showed the converse; and although it was a small study of 21 malignant minor SGTs, it showed malignant minor SGTs to be more common in males (71.43%) than females (28.57%).

6.4 Benign versus malignant minor SGTs

The ratio of benign to malignant SGTs was 1.38:1. This comprised 56.96% benign and 43.04% malignant tumours. There were conflicting reports on the incidence of benign and malignant SGTs from South Africa, Africa and the international literature, especially regarding which tumours occurred more commonly. To date there is no reasonable explanation as to why such differences exist.

6.4.1 South African studies

The study by Van Heerden & Raubenheimer (1991) differed from our study in that malignant SGTs (52%) were more common than benign tumours (48%), whilst Isacsson & Shear (1983) showed far fewer malignant tumours (28%) than benign tumours (72.5%).

6.4.2 African studies

The Zimbabwean study (Chidzonga, Lopez Perez & Portilla-Alvarez, 1995) also revealed a higher incidence of benign tumours (77.35%) when compared to malignant tumours (22.64%). In contrast, the Ugandan study by Vuhahula (2004) showed slightly more malignant (53%) than benign tumours (47%). The authors do not offer a clear explanation as to why this is so.

6.4.3 Asian studies

In contrast to our study, reports from Asia show that malignant minor SGTs are more common than benign tumours (Wang et al., 2007; Tilakaratne et al., 2009; Taghavi et al., 2017; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013). However, a Japanese study by Toida et al. (2006) showed 67.1% of tumours diagnosed to be benign versus 32.9% malignant tumours in their series of 82 intra-oral minor SGTs.

6.4.4 American and European studies

In America and Europe, some studies showed malignant minor SGTs to be more common (Jansisyanont, Blanchaert & Ord, 2002; Sarmento et al., 2016; Barros et al., 2010; Lukšić et al., 2012), whereas other reports showed benign minor SGTs to be more common (Abrahão et al., 2016; Loyola et al., 1995; Rivera-Bastidas, Ocanto & Acevedo, 1996; Buchner, Merrell & Carpenter, 2007). Reasons for these discrepancies have not yet been provided.

Interestingly, Jansisyanont, Blanchaert & Ord (2002) showed an increased incidence of white patients in their sample of 80 intra-oral SGTs, and that malignant tumours were more common. On the contrary, there were more black patients in the series of 201 intra-oral SGTs reported by Isacsson & Shear (1983). Most of the tumours were benign. Whilst this may suggest that race may play a role in the aetiology of benign or malignant minor SGTs, it may purely be a population bias reflecting the demographics of the patients seen in the respective areas of study. Further, it would be inappropriate to draw any inferences as regards the role of race as a factor in the incidence of SGTs as the cohort, especially in the study by Isacsson & Shear (1983) the patients may well have been drawn entirely from the public sector, which, by nature of the demographics in South Africa, comprises largely of black patients. Our study refrained from investigating the role of race in the patient demographics of SGTs.

6.5 Histological types of SGTs

6.5.1 Histologic types of tumours of the major and minor salivary glands

In the current study, pleomorphic adenoma was the most common tumour in both the minor (51.89%) and major (73%) salivary glands. The second and third most common tumours in the minor salivary glands for both genders were adenoid cystic carcinoma and mucoepidermoid carcinoma respectively. Interestingly, the second most common tumour in the major salivary glands in males was Warthin tumour, whereas in females it was adenoid cystic carcinoma.

Similarly, the African studies by Gbotolorun et al. (2008) (34.2%), Vuhahula (2004) (31.81%) and Chidzonga, Lopez Perez & Portilla-Alvarez (1995) (71.69%) also confirmed pleomorphic adenoma to be the most common tumour when considering both benign and malignant SGTs. These findings were supported by reports from Asia, the Americas and Europe, which also found the most common tumour of the salivary glands to be pleomorphic adenoma (Tilakaratne et al., 2009; Taghavi et al., 2017; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Shen et al., 2018; Lukšić et al., 2012).

6.5.2 Histologic types of benign minor salivary glands

Undoubtedly, pleomorphic adenoma is the most common benign minor SGT. In our study, the most common benign minor SGTs were pleomorphic adenoma (51.89%), followed by myoepithelioma (2.17%) and canalicular adenoma (1.99%).

6.5.2.1 *South African studies*

In the South African study by Isacsson & Shear (1983), 70% of tumours diagnosed were benign mixed tumour, commonly referred to as pleomorphic adenoma and 2.5% were monomorphic adenomas (now referred to as canalicular adenoma and basal cell adenoma). In the study by Van Heerden & Raubenheimer (1991), 48% of tumours diagnosed were benign mixed tumours and the histologic type of the other benign minor SGTs was not provided.

6.5.2.2 *African studies*

Gbotolorun et al. (2008) showed pleomorphic adenoma (90.1%) to be most common followed by basal cell adenoma (5.45%) and myoepithelioma (3.63%). Vuhahula

(2004) showed that pleomorphic adenoma was most common (68.3%) followed by myoepithelioma (19.5%) and basal cell adenoma (6.2%) and Chidzonga, Lopez Perez & Portilla-Alvarez et al. (1995) showed 73.6% of benign tumours to be pleomorphic adenoma.

6.5.2.3 *Asian, American and European studies*

Pleomorphic adenoma was the most common benign minor SGT diagnosed, ranging from 81.8% to 96.4%. In no particular order, this was followed by a decreased incidence of monomorphic adenoma, canalicular adenoma, basal cell adenoma and cystadenoma (Wang et al., 2007; Shen et al., 2018; Toida et al., 2006; Tilakaratne et al., 2009; Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007; Loyola et al., 1995; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016; Lukšić et al., 2012).

6.5.3 Histologic types of malignant minor SGTs

In our study, the most common malignant minor SGTs in descending order were adenoid cystic carcinoma (12.83%), mucoepidermoid carcinoma (10.49%), PLGA (9.40%), acinic cell carcinoma (2.89%), adenocarcinoma (2.89%), carcinoma ex pleomorphic adenoma (2.17%) and myoepithelial carcinoma (1.45%).

6.5.3.1 *South African studies*

Isacsson & Shear (1983) showed in decreasing frequency the most common malignant minor SGTs to be adenoid cystic carcinoma (37.5%), adenocarcinoma (26.7%), mucoepidermoid (23.21%), carcinoma ex pleomorphic adenoma (8.9%), and epidermoid carcinoma (3.57%). Contrary to our study, Van Heerden & Raubenheimer (1991) found the most common malignant minor SGT to be PLGA (30%) followed by adenoid cystic carcinoma (25%), mucoepidermoid carcinoma (16.7%), carcinoma ex pleomorphic adenoma (14%), adenocarcinoma (8.3%), undifferentiated carcinoma (2.8%) and epithelial- myoepithelial carcinoma (2.8%).

6.5.3.2 *African studies*

Vuhahula (2004) concurred with our finding that the most common malignant minor SGT was adenoid cystic carcinoma (38.3%) followed by mucoepidermoid carcinoma (19.2%); but found the third most common tumour to be PLGA. On the other hand, Gbotolorun et al. (2008) showed the most common malignant minor SGTs to be

mucoepidermoid carcinoma, adenoid cystic carcinoma and adenocarcinoma respectively.

6.5.3.3 *Asian, American and European studies*

International studies report conflicting results as regards the most common malignant minor SGTs. Studies similar to the current study show adenoid cystic carcinoma to be most common followed by mucoepidermoid carcinoma (Strick et al., 2000; Barros et al., 2010; Jaafari-Ashkavandi, Ashraf & Moshaverinia, 2013; Taghavi et al., 2015; Toida et al., 2005; Wang et al., 2006; Tilakaratne et al., 2009).

Various studies showed mucoepidermoid carcinoma to be the most common followed by adenoid cystic carcinoma (Lukšić et al., 2012; Rivera-Bastidas, Ocanto & Acevedo, 1996; Loyola et al., 1995). Yet, whilst other studies showed mucoepidermoid carcinoma to be the most common SGT, this was followed by PLGA (Buchner, Merrell & Carpenter, 2007; Abrahão et al., 2016; Sarmento et al., 2016).

6.6 Site of SGTs

The most common site for minor SGTs in the current study was the palate as a whole, including the hard palate, soft palate and palate (NOS). The remaining intra-oral sites were grouped as “other sites”.

Our results of the palate being the most common site correlated with most studies worldwide (Wang et al., 2007; Shen et al., 2018; Toida et al., 2006; Tilakaratne et al., 2009; Jansisyanont, Blanchaert & Ord, 2002; Buchner, Merrell & Carpenter, 2007; Loyola et al., 1995; Barros et al., 2010; Rivera-Bastidas, Ocanto & Acevedo, 1996; Abrahão et al., 2016; Sarmento et al., 2016 ; Lukšić et al., 2012; Taghavi et al., 2017; Vuhahula, 2004; Gbotolorun et al., 2008; Isacsson & Shear, 1983; Van Heerden & Raubenheimer, 1991; Chidzonga, Lopez Perez & Portilla-Alvarez, 1995; Shen et al., 2018). Determination of exactly where the tumour occurred in the palate was difficult to ascertain, as the various different palatal sites were not delineated in most studies.

6.7 Potential study limitations and strengths

This is a retrospective audit where data was obtained from departmental histology reports. Whilst the histology records were well kept, some clinical information was lacking as the referring clinicians submitted this in the first instance, resulting in some incomplete patient data.

The referral basis of the tumours assessed in this study was mainly from governmental academic institutions in South Africa, and represents one of the largest public or state referral centres in the country. Johannesburg is the largest city in South Africa with the highest population per square kilometre in the country. In addition oral and maxillofacial biopsy specimens from patients from the south of Gauteng, outlying, peripheral and rural areas, other provinces and neighbouring countries such as Namibia, Mozambique, Swaziland and Zimbabwe are often diagnosed in the Oral Pathology Unit. This may reflect in the increased incidence of SGTs seen in the study.

On the other hand, whilst the sample size of minor SGTs was large, many tumours are also referred to the Department of Anatomical Pathology and were not included in this study. Thus, this study may not reflect the true incidence of SGTs in the population at large.

Further, it is significant to note that this study is a description of the incidence of minor SGTs diagnosed in a defined specialised Maxillofacial and Oral Pathology Unit. It thus by no means represents an accurate reflection of the incidence of SGTs diagnosed by pathologists in the greater Johannesburg area.

It has however a relatively accurate and thorough insight of the SGTs diagnosed in this specialised Oral Pathology Unit. Whilst the main focus was on minor SGTs, the study gives a well balance overview of SGTs in general as well as those occurring in the major salivary glands.

A major strength of this 20-year retrospective study no doubt is that it offers an overview of the SGTs, especially those of the minor salivary glands seen in a defined population sample in South Africa, and thus provides a baseline or reference for future studies on SGTs, especially in South Africa.

CHAPTER 7

7. CONCLUSION

Minor SGTs represented 2.24% of the total number of oral pathology cases diagnosed over the 20-year period in the Department of Oral Pathology, University of the Witwatersrand, Johannesburg, with 57% being benign and 43% being malignant. The incidence of minor SGTs in this study was much higher than most previous reports and is similar to the trends found in China. This study showed no overall increase in the number of minor SGTs diagnosed per year.

More specifically, the study showed:

- The three most common histologic types of minor SGTs to be pleomorphic adenoma (52%), adenoid cystic carcinoma (12%) and mucoepidermoid carcinoma (10%).
- A female predilection for both benign and malignant minor SGTs.
- No gender difference in terms of age, however when considering histologic tumour types, benign tumours presented at an average of ten years earlier than malignant tumours, a finding consistent with most published literature.
- The palate to be the most common anatomical site for minor SGTs, with pleomorphic adenoma being the most common minor SGT for both genders at all anatomical sites.
- The most common benign minor SGT in the hard palate to be pleomorphic adenoma and the most common malignant minor SGT to be adenoid cystic carcinoma for both genders, whereas in the soft palate, mucoepidermoid carcinoma was more common in females and mucoepidermoid carcinoma was the most common malignant tumour in the palate (NOS) across both genders.
- For all other sites, malignant minor SGTs were more common in females than males, with adenoid cystic carcinoma and PLGA being more common in females.

CHAPTER 8

8. REFERENCES

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CHAPTER 9

9. APPENDICES

APPENDIX A: DATA COLLECTION SHEET

Minor salivary gland tumours: a 20-year retrospective audit of cases in the Oral Pathology Unit at the University of the Witwatersrand, Johannesburg

Pathology report no. _____ **Date**

D	D	M	M	Y	Y

Age [ ] **Gender** Male 1 | Female 2

Benign 1 **Malignant** 2

Salivary gland neoplasm: Histologic type:

Anatomic Site	
Parotid	1
Submandibular	2
Sublingual	3
Gingiva	4
Hard Palate	5
Soft palate	6
Buccal mucosa	7
Labial mucosa/Lip	8
Lingual mucosa/Tongue	9
Retromolar area	10
Floor of mouth	11
Pharynx	12
Nasopharynx	13
Tongue	14
Nasal cavity	15
Sinuses	16
Jaw	17
Other:	
Site not specified	99

Clinical appearance:

_____
_____
_____

Additional General information:

_____
_____
_____
_____
_____

APPENDIX B: ETHICS CLEARANCE CERTIFICATE

R14/49 Dr Yaseer Mahomed

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M170130

NAME: (Principal Investigator)	Dr Yaseer Mahomed
DEPARTMENT:	Otorhinolaryngology Department of Oral Pathology
PROJECT TITLE:	Minor Salivary Gland Tumours: A 20-Year Retrospective Audit of Cases in the Oral Pathology Unit at the University of the Witwatersrand, Johannesburg
DATE CONSIDERED:	27/01/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Shabnum Meer
APPROVED BY:	Professor P. Cleaton-Jones, Chairperson, HREC (Medical)
DATE OF APPROVAL:	26/04/2017

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary 3rd floor, Philip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated,from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially review in January and will therefore be due in the month of January each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX C: RAW DATA

Study no	Date	Age	Gender	Benign/ Malignant	Histologic type	Anatomic site	Specify
0001	1997	40	2	2	Adenoid Cystic carcinoma	5	
0002	1997	37	2	1	Pleomorphic adenoma	99	Palate
0003	1997	50	1	2	Mucoepidermoid carcinoma	2	
0004	1997	77	1	2	Adenocarcinoma low-grade	5	
0005	1997	61	1	2	Adenoid Cystic carcinoma	2	
0006	1997	63	1	2	Salivary ductal cancer	1	
0007	1997	34	1	1	Pleomorphic adenoma	99	Palate
0008	1997	29	1	1	Pleomorphic adenoma	2	
0009	1997	34	2	1	Pleomorphic adenoma	2	
0010	1997	37	1	2	Adenoid Cystic carcinoma	99	Palate
0011	1997	19	2	1	Pleomorphic adenoma	99	Palate
0012	1997	17	1	2	Mucoepidermoid carcinoma	14	
0013	1997	19	2	1	Pleomorphic adenoma	5	
0014	1997	72	1	1	Pleomorphic adenoma	17	
0015	1997	19	2	1	Pleomorphic adenoma	8	
0016	1997	46	1	2	Adenocarcinoma low-grade	5	
0017	1997	29	2	2	Adenocarcinoma low-grade	99	Palate
0018	1997	30	2	1	Pleomorphic adenoma	99	Palate
0019	1997	55	1	2	Adenoid Cystic carcinoma	5	
0020	1997	68	1	2	Adenocarcinoma low-grade	5	
0021	1997	22	1	1	Pleomorphic adenoma	99	Palate
0022	1997	29	2	1	Pleomorphic adenoma	99	Palate
0023	1997	44	2	2	Adenocarcinoma low-grade	7	
0024	1997	44	2	2	Adenocarcinoma	7	
0025	1997	20	2	1	Pleomorphic adenoma	2	
0026	1997	72	2	2	Adenocarcinoma low-grade	6	
0027	1997	67	1	2	Clear cell myoepithelioma	8	
0028	1997	77	1	2	Adenocarcinoma	99	Palate
0029	1997	29	2	1	Pleomorphic adenoma	99	Palate
0030	1997	44	2	2	Adenocarcinoma low-grade	7	
0031	1997	29	2	1	Pleomorphic adenoma	1	
0032	1997	78	2	1	Pleomorphic adenoma	99	Tonsil
0033	1997	74	2	2	Mucoepidermoid carcinoma	99	Palate
0034	1997	39	2	2	Adenoid Cystic carcinoma	6	
0035	1997	29	1	1	Pleomorphic adenoma	2	
0036	1998	47	2	2	Adenocarcinoma low-grade	5	
0037	1998	66	2	1	Pleomorphic adenoma	99	Palate
0038	1998	18	1	1	Myoepithelioma	16	
0039	1998	54	2	2	Adenocarcinoma low-grade	16	
0040	1998	75	2	2	Adenocarcinoma	99	Palate
0041	1998	60	2	1	Pleomorphic adenoma	2	
0042	1998	38	2	1	Pleomorphic adenoma	1	
0043	1998	44	2	1	Pleomorphic adenoma	99	Palate
0044	1998	18	1	1	Pleomorphic adenoma	99	
0045	1998	14	2	1	Pleomorphic adenoma	7	
0046	1998	18	1	1	Pleomorphic adenoma	99	
0047	1998	38	2	1	Pleomorphic adenoma	99	Palate
0048	1998	14	2	2	Mucoepidermoid carcinoma	99	Palate
0049	1998	40	2	1	Pleomorphic adenoma	99	Palate
0050	1998	62	2	2	Adenoid Cystic carcinoma	99	Palate
0051	1998	54	1	2	Mucoepidermoid carcinoma	16	
0052	1998	36	2	1	Pleomorphic adenoma	5	
0053	1999	55	1	2	Mucoepidermoid carcinoma	5	
0054	1999	66	1	2	Adenoid Cystic carcinoma	11	
0055	1999	60	2	1	Pleomorphic adenoma	1	
0056	1999		1	2	Adenocarcinoma low-grade	5	
0057	1999	37	2	1	Pleomorphic adenoma	10	
0058	1999	42	2	1	Pleomorphic adenoma	2	
0059	1999	58	1	2	Epimyoepithelial carcinoma / carcinoma ex pleomorphic adenoma	1	
0060	1999	54	1	2	Mucoepidermoid carcinoma	99	Palate

0061	1999	51	2	1	Pleomorphic adenoma	2	
0062	1999	33	2	2	Adenoid Cystic carcinoma	15	
0063	1999	34	1	1	Pleomorphic adenoma	1	
0064	1999	42	2	2	Adenoid Cystic carcinoma	16	
0065	1999	29	2	1	Pleomorphic adenoma	1	
0066	1999	62	2	1	Pleomorphic adenoma	1	
0067	1999	40	1	1	Pleomorphic adenoma	2	
0068	1999	19	1	1	Pleomorphic adenoma	2	
0069	1999			2	Adenocarcinoma low-grade	99	Palate
0070	1999	64	2	2	Adenocarcinoma	2	
0071	1999	19	2	1	Pleomorphic adenoma	2	
0072	1999	17	2	2	Mucoepidermoid carcinoma	1	
0073	1999	11	2	1	Pleomorphic adenoma	7	
0074	1999	34	2	1	Pleomorphic adenoma	1	
0075	1999	19	2		Adenocarcinoma	1	
0076	1999	42	2	1	Pleomorphic adenoma	2	
0077	1999	41	2	1	Pleomorphic adenoma	6	
0078	1999	30	1	1	Pleomorphic adenoma	1	
0079	1999	45	2	2	Adenoid Cystic carcinoma	1	
0080	1999	56	2	2	Oncocytic carcinoma	1	
0081	1999	28	1	1	Pleomorphic adenoma	99	Palate
0082	1999	72	2	1	Pleomorphic adenoma	2	
0083	1999	37	2	1	Pleomorphic adenoma	1	
0084	1999	26	2	1	Pleomorphic adenoma	1	
0085	1999	62	2	1	Myoepithelioma	99	Palate
0086	1999	98	2	1	Pleomorphic adenoma	2	
0087	1999	46	1	1	Myoepithelioma	1	
0088	1999	51	1		Adenocarcinoma	3	
0089	1999	31	2	2	Acinic cell carcinoma	2	
0090	1999	54	2	1	Pleomorphic adenoma	1	
0091	1999	62	1	2	Myoepithelial carcinoma	15	
0092	1999	49	2	1	Pleomorphic adenoma	1	
0093	1999	26	1	1	Pleomorphic adenoma	99	Palate
0094	1999	57	1	2	Adenocarcinoma low-grade	99	Palate
0095	1999	51	1	2	Ductal carcinoma	1	
0096	1999	53	1	1	Pleomorphic adenoma	1	
0097	1999	27	1	1	Monomorphic adenoma	1	
0098	1999	63	1	1	Pleomorphic adenoma	2	
0099	1999	51	2	1	Pleomorphic adenoma	2	
0100	1999	75	1	1	Pleomorphic adenoma	99	Palate
0101	1999	40	2	1	Pleomorphic adenoma	2	
0102	1999	54	1	1	Pleomorphic adenoma	2	
0103	1999	47	2	1	Pleomorphic adenoma	1	
0104	1999	76	2	2	Mucoepidermoid carcinoma	16	
0105	1999	72	2	1	Adenoid Cystic carcinoma	2	
0106	1999	33	1	1	Pleomorphic adenoma	1	
0107	1999	17	1	1	Pleomorphic adenoma	99	Palate
0108	1999	39	2	1	Pleomorphic adenoma	7	
0109	1999	75	1	1	Pleomorphic adenoma	99	Palate
0110	1999	47	2		Adenocarcinoma	10	
0111	1999	37	2	1	Pleomorphic adenoma	1	
0112	1999	50	2	2	Adenocarcinoma	6	
0113	1999	31	1	2	Acinic cell carcinoma	7	
0114	1999	51	1	2	Ductal carcinoma	16	
0115	1999	38	2	1	Myoepithelioma	6	
0116	2000	58	2	2	Adenocarcinoma	99	
0117	2000	43	1	2	Adenoid Cystic carcinoma	99	Palate
0118	2000	68	2	1	Pleomorphic adenoma	1	
0119	2000	40	1	1	Pleomorphic adenoma	1	
0120	2000	14	1	1	Myoepithelioma	5	
0121	2000	62	1	1	Pleomorphic adenoma	1	
0122	2000	30	2	2	Adenocarcinoma	99	
0123	2000	60	2	1	Pleomorphic adenoma	1	
0124	2000	23	1	1	Pleomorphic adenoma	2	
0125	2000	57	2	2	Adenoid Cystic carcinoma	2	

0126	2000	14	2	1	Myoepithelioma	99	Palate
0127	2000	45	2	1	Pleomorphic adenoma	2	
0128	2000	70	1	1	Warthin tumour	1	
0129	2000	78	2	2	Acinic cell carcinoma	1	
0130	2000	17	2	1	Pleomorphic adenoma	2	
0131	2000	74	2	2	Adenocarcinoma	1	
0132	2000	14	2	1	Myoepithelioma	6	
0133	2000	22	2	1	Pleomorphic adenoma	2	
0134	2000	69	2	1	Pleomorphic adenoma	2	
0135	2000	69	2	1	Myoepithelioma	2	
0136	2000	78	1	1	Warthin tumour	1	
0137	2000	35	1	1	Pleomorphic adenoma	1	
0138	2000	30	1	1	Pleomorphic adenoma	2	
0139	2000	62	2	1	Pleomorphic adenoma	1	
0140	2000	46	2	1	Pleomorphic adenoma	1	
0141	2000	67	1	1	Canalicular adenoma	8	
0142	2000	25	2	1	Pleomorphic adenoma	99	Palate
0143	2000	33	2	1	Pleomorphic adenoma	8	
0144	2000		2	1	Pleomorphic adenoma	1	
0145	2000	57	1	1	Pleomorphic adenoma	1	
0146	2000	46	2	1	Pleomorphic adenoma	1	
0147	2000	36	1	1	Pleomorphic adenoma	2	
0148	2000	65	2	1	Canalicular adenoma	8	
0149	2000	76	1	2	Mucoepidermoid carcinoma	7	
0150	2000	49	1	1	Pleomorphic adenoma	99	Palate
0151	2000	20	1	1	Pleomorphic adenoma	1	
0152	2000			2	Adenocarcinoma	1	
0153	2000	71	2	2	Adenoid Cystic carcinoma	11	
0154	2000		1	1	Pleomorphic adenoma	2	
0155	2000	33	2	1	Pleomorphic adenoma	99	
0156	2000	8	2	2	Mucoepidermoid carcinoma	1	
0157	2000	72	2	2	Mucoepidermoid carcinoma	99	Palate
0158	2000	49	1	1	Pleomorphic adenoma	1	
0159	2000	61	2	2	Adenocarcinoma low-grade	5	
0160	2000	78	1	1	Pleomorphic adenoma	1	
0161	2000		2	2	Carcinoma ex pleomorphic adenoma	1	
0162	2000	70	2	1	Pleomorphic adenoma	2	
0163	2000		1	1	Pleomorphic adenoma	1	
0164	2000	27	2	1	Pleomorphic adenoma	5	
0165	2000	42	2	1	Pleomorphic adenoma	99	Palate
0166	2000	57	2	1	Pleomorphic adenoma	6	
0167	2000	40	1	1	Pleomorphic adenoma	6	
0168	2000	38	2	1	Pleomorphic adenoma	1	
0169	2000	41	2	1	Pleomorphic adenoma	99	Palate
0170	2000	32	1	1	Pleomorphic adenoma	99	Palate
0171	2000	48	2	1	Pleomorphic adenoma	1	
0172	2000	68	2	1	Warthin tumour	1	
0173	2000		2	1	Pleomorphic adenoma	2	
0174	2000	79	2	2	Carcinoma ex pleomorphic adenoma	6	
0175	2000	57	1	2	Adenocarcinoma	99	Mouth
0176	2000	55	1	1	Pleomorphic adenoma	99	Palate
0177	2000		1	1	Pleomorphic adenoma	1	
0178	2000	67	1	2	Adenoid Cystic carcinoma	6	
0179	2000	28	2	2	Mucoepidermoid carcinoma	1	
0180	2001	53	2	2	Adenoid Cystic carcinoma	1	
0181	2001	63	2	2	Adenocarcinoma low-grade	16	
0182	2001	12	2	1	Myoepithelioma	5	
0183	2001	54	1	2	Carcinoma ex pleomorphic adenoma	1	
0184	2001	37	2	1	Pleomorphic adenoma	1	
0185	2001	61	1	2	Carcinoma ex pleomorphic adenoma	1	
0186	2001	27	1	1	Pleomorphic adenoma	1	
0187	2001	60	2	1	Pleomorphic adenoma	1	
0188	2001	35	1	1	Pleomorphic adenoma	1	
0189	2001	26	2	1	Pleomorphic adenoma	1	
0190	2001	31	1	1	Pleomorphic adenoma	1	

0191	2001	48	2	1	Warthin tumour	1	
0192	2001	35	1	1	Pleomorphic adenoma	6	
0193	2001	43	2	1	Pleomorphic adenoma	5	
0194	2001	60	2	1	Pleomorphic adenoma	1	
0195	2001	62	2	1	Pleomorphic adenoma	2	
0196	2001	20	1	2	Mucoepidermoid carcinoma	2	
0197	2001	74	2	2	Adenoid Cystic carcinoma	99	
0198	2001	54	2	1	Pleomorphic adenoma	2	
0199	2001	32	1	2	Acinic cell carcinoma	8	
0200	2001	31	2	1	Pleomorphic adenoma	2	
0201	2001	64	2	1	Pleomorphic adenoma	1	
0202	2001	35	2	2	Adenoid Cystic carcinoma	2	
0203	2001	40	2	1	Pleomorphic adenoma	2	
0204	2001	35	2	1	Pleomorphic adenoma	16	
0205	2001	19	1	1	Pleomorphic adenoma	1	
0206	2001	73	1	2	Adenocarcinoma	8	
0207	2001	72	2	1	Myoepithelioma	7	
0208	2001	44	2	1	Pleomorphic adenoma	1	
0209	2001	63	1	2	Mucoepidermoid carcinoma	1	
0210	2001	58	1	2	Adenocarcinoma	5	
0211	2001	31	1	1	Pleomorphic adenoma	5	
0212	2001	39	1	2	Adenoid Cystic carcinoma	17	
0213	2001	63	2	2	Mucoepidermoid carcinoma	1	
0214	2001	23	1	1	Pleomorphic adenoma	1	
0215	2001	26	2	1	Pleomorphic adenoma	5	
0216	2001	91	2	2	Adenocarcinoma low-grade	99	Palate
0217	2001	59	2	1	Pleomorphic adenoma	17	
0218	2001	62	1	1	Pleomorphic adenoma		
0219	2001	32	2	1	Pleomorphic adenoma	99	Palate
0220	2001	27	1	1	Pleomorphic adenoma	5	
0221	2001	29	2	1	Pleomorphic adenoma	1	
0222	2001	34	1	1	Pleomorphic adenoma	2	
0223	2001	72	1	2	Adenoid Cystic carcinoma	8	
0224	2001	26	2	2	Adenoid Cystic carcinoma	2	
0225	2001	52	1	1	Pleomorphic adenoma	1	
0226	2001	29	1	2	Adenoid Cystic carcinoma	6	
0227	2001	50	1	1	Pleomorphic adenoma	1	
0228	2001	39	2	1	Pleomorphic adenoma	1	
0229	2001	80	2	2	Carcinoma ex pleomorphic adenoma	2	
0230	2001	70	2	1	Pleomorphic adenoma	1	
0231	2001	34	1	1	Pleomorphic adenoma	1	
0232	2001		2	1	Pleomorphic adenoma	7	
0233	2001	64	1	2	Carcinoma ex pleomorphic adenoma	99	Palate
0234	2001	33	1	2	Acinic cell carcinoma	1	
0235	2001	21	2	1	Pleomorphic adenoma	2	
0236	2001	52	1	2	Mucoepidermoid carcinoma	1	
0237	2001	26	1	2	Acinic cell carcinoma	1	
0238	2001	43	2	2	Mucoepidermoid carcinoma	5	
0239	2001	12	2	2	Acinic cell carcinoma	1	
0240	2001	47	2	1	Pleomorphic adenoma	2	
0241	2001	34	1	2	Adenoid Cystic carcinoma	1	
0242	2001	46	2	1	Pleomorphic adenoma	1	
0243	2001		2	1	Pleomorphic adenoma	6	
0244	2001	62	1	1	Pleomorphic adenoma	99	Palate
0245	2001	34	1	1	Pleomorphic adenoma	1	
0246	2001	61	1	2	Mucoepidermoid carcinoma	17	
0247	2001	61	2	1	Pleomorphic adenoma	1	
0248	2001	31	2	1	Pleomorphic adenoma	2	
0249	2001	30	2	2	Mucoepidermoid carcinoma	7	
0250	2002	28	1	1	Pleomorphic adenoma	2	
0251	2002	58	2	1	Pleomorphic adenoma	2	
0252	2002	61	2	2	Adenocarcinoma low-grade	5	
0253	2002	58	1	2	Ductal carcinoma	2	
0254	2002	49	2	1	Pleomorphic adenoma	2	
0255	2002	53	2	1	Myoepithelioma	1	

0256	2002	19	2	1	Pleomorphic adenoma	1	
0257	2002	65	2	1	Pleomorphic adenoma	8	
0258	2002	11	2	1	Pleomorphic adenoma	2	
0259	2002	28	1	1	Pleomorphic adenoma	2	
0260	2002	64	1	2	Mucoepidermoid carcinoma	2	
0261	2002	47	2	1	Pleomorphic adenoma	2	
0262	2002	23	1	1	Pleomorphic adenoma	99	Palate
0263	2002	37	2	1	Pleomorphic adenoma	2	
0264	2002	32	2	1	Pleomorphic adenoma	1	
0265	2002	48	2	1	Pleomorphic adenoma	5	
0266	2002	59	1	2	Adenoid Cystic carcinoma	5	
0267	2002	62	1	1	Pleomorphic adenoma	5	
0268	2002	23	2	1	Pleomorphic adenoma	1	
0269	2002	39	2	1	Pleomorphic adenoma	1	
0270	2002	42	1	2	Adenoid Cystic carcinoma	2	
0271	2002	51	2	2	Adenocarcinoma low-grade	14	
0272	2002			1	Pleomorphic adenoma	99	Palate
0273	2002	53	2	1	Pleomorphic adenoma	1	
0274	2002	31	2	1	Pleomorphic adenoma	2	
0275	2002	61	2	1	Pleomorphic adenoma	1	
0276	2002	38	2	1	Pleomorphic adenoma	1	
0277	2002	48	1	1	Pleomorphic adenoma	99	Palate
0278	2002	71	2	1	Pleomorphic adenoma	6	
0279	2002	37	1	1	Pleomorphic adenoma	99	
0280	2002		2	1	Pleomorphic adenoma	2	
0281	2002	39	1	1	Pleomorphic adenoma	1	
0282	2002	38	1	1	Pleomorphic adenoma	1	
0283	2002	39	1	1	Pleomorphic adenoma	1	
0284	2002	22	2	1	Pleomorphic adenoma	6	
0285	2002	54	2	1	Myoepithelioma	5	
0286	2002	30	2	1	Pleomorphic adenoma	1	
0287	2002	62	2	1	Pleomorphic adenoma	2	
0288	2002	33	1	1	Pleomorphic adenoma	2	
0289	2002	59	1	1	Pleomorphic adenoma	2	
0290	2002	86	2	2	Carcinoma ex pleomorphic adenoma	1	
0291	2002	26	2	1	Pleomorphic adenoma	2	
0292	2002	26	2	1	Pleomorphic adenoma	5	
0293	2002	57	2	1	Pleomorphic adenoma	2	
0294	2002	43	1	2	Adenoid Cystic carcinoma	5	
0295	2002	32	2	1	Pleomorphic adenoma	1	
0296	2002		1	1	Pleomorphic adenoma	99	Palate
0297	2002	42	1	1	Pleomorphic adenoma	1	
0298	2002	50	2	1	Pleomorphic adenoma	1	
0299	2002	28	2	1	Pleomorphic adenoma	1	
0300	2002	34	2	1	Pleomorphic adenoma	99	Palate
0301	2002	22	1	1	Pleomorphic adenoma	99	Palate
0302	2002	45	2	2	Adenoid Cystic carcinoma	99	Palate
0303	2002	78	1	1	Pleomorphic adenoma	1	
0304	2002	60	2	2	Adenocarcinoma low-grade	5	
0305	2002	21	2	2	Mucoepidermoid carcinoma	1	
0306	2002	51	2	1	Pleomorphic adenoma	1	
0307	2002	25		1	Pleomorphic adenoma	2	
0308	2002	13	2	1	Pleomorphic adenoma	1	
0309	2002	39	1	2	Adenoid Cystic carcinoma	1	
0310	2002	44	1	1	Pleomorphic adenoma	1	
0311	2002	82	2	1	Pleomorphic adenoma	1	
0312	2002	23	2	2	Carcinoma ex pleomorphic adenoma	7	
0313	2002	29	1	1	Pleomorphic adenoma	1	
0314	2002	60	2	2	Acinic cell carcinoma	14	
0315	2002	67	1	2	Carcinoma ex pleomorphic adenoma	99	Palate
0316	2002	45	2	2	Adenoid Cystic carcinoma	99	Palate
0317	2002	42	2	2	Adenoid Cystic carcinoma	1	
0318	2002	32	1	1	Pleomorphic adenoma	2	
0319	2002	59	1	2	Adenoid Cystic carcinoma	99	Palate
0320	2002	17	2	1	Pleomorphic adenoma	5	

0321	2002	39	2	2	Adenoid Cystic carcinoma	2	
0322	2002	63	1	1	Warthin tumour	1	
0323	2002	22	2	1	Pleomorphic adenoma	2	
0324	2002	22	2	1	Pleomorphic adenoma	7	
0325	2002	68	1	2	Carcinoma ex pleomorphic adenoma	1	
0326	2002	20	1	1	Pleomorphic adenoma	2	
0327	2002	70	1	1	Pleomorphic adenoma	1	
0328	2002	20	1	1	Pleomorphic adenoma	1	
0329	2002	64	2	1	Pleomorphic adenoma	99	Palate
0330	2002	71	2	1	Pleomorphic adenoma	2	
0331	2002	50	2	1	Pleomorphic adenoma	99	Palate
0332	2002	30	1	1	Pleomorphic adenoma	1	
0333	2002	25	2	1	Pleomorphic adenoma	6	
0334	2002	76	1	2	Adenocarcinoma low-grade	7	
0335	2002		2	2	Acinic cell carcinoma	1	
0336	2002	42	2	1	Pleomorphic adenoma	1	
0337	2002	46	1	2	Mucoepidermoid carcinoma	2	
0338	2002	15	2	2	Mucoepidermoid carcinoma	2	
0339	2003	33	1	1	Pleomorphic adenoma	99	Palate
0340	2003	14	2	1	Pleomorphic adenoma	99	Palate
0341	2003	36	1	1	Pleomorphic adenoma	1	
0342	2003	55	2	2	Myoepithelial carcinoma	14	
0343	2003	63	2	1	Pleomorphic adenoma	2	
0344	2003	61	2	1	Pleomorphic adenoma	99	Palate
0345	2003	73	2	1	Pleomorphic adenoma	1	
0346	2003	14	2	1	Pleomorphic adenoma	99	
0347	2003	38	2	2	Adenoid Cystic carcinoma	17	
0348	2003	41	2	2	Myoepithelial carcinoma	1	
0349	2003	38	2	1	Pleomorphic adenoma	99	
0350	2003	60	2	1	Pleomorphic adenoma	1	
0351	2003	39	1	2	Adenoid Cystic carcinoma	99	Palate
0352	2003	51	1	1	Pleomorphic adenoma	5	
0353	2003	29	2		Pleomorphic adenoma	99	Palate
0354	2003	21	1	1	Pleomorphic adenoma	1	
0355	2003	32	2	1	Pleomorphic adenoma	1	
0356	2003	33	1	1	Pleomorphic adenoma	2	
0357	2003	40	2	1	Myoepithelioma	8	
0358	2003	36	2	1	Pleomorphic adenoma	99	Palate
0359	2003	71	1	1	Pleomorphic adenoma	2	
0360	2003	14	2	1	Pleomorphic adenoma	5	
0361	2003	20	1	1	Pleomorphic adenoma	1	
0362	2003	39	2	1	Pleomorphic adenoma	2	
0363	2003	20	1	1	Pleomorphic adenoma	17	
0364	2003	44	2	1	Pleomorphic adenoma	1	
0365	2003	37	1	1	Pleomorphic adenoma	1	
0366	2003	36	2	1	Myoepithelioma	99	Palate
0367	2003	41	2	2	Epithelial myoepithelial carcinoma	1	
0368	2003	65	2	1	Pleomorphic adenoma	99	Palate
0369	2003	56	1	2	Mucoepidermoid carcinoma	16	
0370	2003	27	1	1	Pleomorphic adenoma	1	
0371	2003	32	2	2	Mucoepidermoid carcinoma	1	
0372	2003	36	1	1	Pleomorphic adenoma	1	
0373	2003	22	2	1	Pleomorphic adenoma	1	
0374	2003	59	2	1	Pleomorphic adenoma	1	
0375	2003	28	2	1	Pleomorphic adenoma	1	
0376	2003	60	2	1	Pleomorphic adenoma	1	
0377	2003	31	1	1	Pleomorphic adenoma	1	
0378	2003	44	2	1	Pleomorphic adenoma	8	
0379	2003	36	1	1	Pleomorphic adenoma	2	
0380	2003	62	2	2	Adenocarcinoma low-grade	8	
0381	2003		2	1	Pleomorphic adenoma	99	Palate
0382	2003	72	2	1	Pleomorphic adenoma	99	Palate
0383	2003	42	2	2	Mucoepidermoid carcinoma	1	
0384	2003	17	2	2	Mucoepidermoid carcinoma	1	
0385	2003	31	1	2	Carcinoma ex pleomorphic adenoma	5	

0386	2003	43	2	2	Mucoepidermoid carcinoma	6	
0387	2003	38	1	1	Pleomorphic adenoma	1	
0388	2003	30	2	2	Mucoepidermoid carcinoma	7	
0389	2003	57	2	1	Myoepithelioma		
0390	2003	75	1	2	Mucoepidermoid carcinoma	2	
0391	2003	33	1	1	Pleomorphic adenoma	2	
0392	2003	14	2	1	Pleomorphic adenoma	5	
0393	2003	52	2	1	Pleomorphic adenoma	1	
0394	2003	47	1	1	Pleomorphic adenoma	7	
0395	2003	72	1	2	Mucoepidermoid carcinoma	1	
0396	2003	40	2	1	Pleomorphic adenoma	2	
0397	2003	58	1	1	Pleomorphic adenoma	2	
0398	2003	21	2	1	Pleomorphic adenoma	1	
0399	2003	54	2	1	Pleomorphic adenoma	2	
0400	2003	40	1	1	Pleomorphic adenoma	1	
0401	2003	20	2	1	Pleomorphic adenoma	8	
0402	2003	56	2	1	Pleomorphic adenoma	1	
0403	2003	53	1	1	Pleomorphic adenoma	5	
0404	2003	27	1	1	Pleomorphic adenoma	2	
0405	2003	38	1	1	Pleomorphic adenoma	1	
0406	2003	44	2	1	Pleomorphic adenoma	5	
0407	2003	44	1	1	Pleomorphic adenoma	1	
0408	2003	25	1	1	Pleomorphic adenoma	1	
0409	2003	22	1	2	Adenocarcinoma	2	
0410	2003	60	2	1	Pleomorphic adenoma	1	
0411	2003	33	2	1	Pleomorphic adenoma	1	
0412	2003	74	2	1	Pleomorphic adenoma	2	
0413	2003	39	2	1	Pleomorphic adenoma	1	
0414	2003	56	2	1	Pleomorphic adenoma	1	
0415	2003	29	2	1	Pleomorphic adenoma	1	
0416	2003	60	2	1	Pleomorphic adenoma	8	
0417	2003	39	1	1	Pleomorphic adenoma	2	
0418	2003	25	2	1	Pleomorphic adenoma	2	
0419	2004	48	2	1	Pleomorphic adenoma	8	
0420	2004	35	1	1	Pleomorphic adenoma	5	
0421	2004	28	2	1	Pleomorphic adenoma	99	Palate
0422	2004	46	2	1	Pleomorphic adenoma	16	
0423	2004	54	2		Adenoid Cystic carcinoma	17	
0424	2004	46	1	2	Carcinoma ex pleomorphic adenoma	1	
0425	2004	27	2	1	Pleomorphic adenoma	99	Palate
0426	2004	48	1	2	Mucoepidermoid carcinoma	7	
0427	2004	27	1	1	Pleomorphic adenoma	1	
0428	2004	66	1	2	Mucoepidermoid carcinoma	14	
0429	2004	42	2	1	Pleomorphic adenoma	1	
0430	2004	35	2	1	Pleomorphic adenoma	99	Palate
0431	2004	67	2	1	Pleomorphic adenoma	1	
0432	2004	68	1	2	Mucoepidermoid carcinoma	1	
0433	2004	18	1	1	Pleomorphic adenoma	2	
0434	2004		2	1	Pleomorphic adenoma	1	
0435	2004	39	2	1	Pleomorphic adenoma	99	Palate
0436	2004	41	2	1	Pleomorphic adenoma	1	
0437	2004		1	1	Pleomorphic adenoma	5	
0438	2004	22	1	1	Pleomorphic adenoma	1	
0439	2004	73	1	1	Pleomorphic adenoma	2	
0440	2004	53	2	2	Mucoepidermoid carcinoma	14	
0441	2004		2	1	Pleomorphic adenoma	1	
0442	2004	44	2	1	Pleomorphic adenoma	1	
0443	2004	60	1	2	Mucoepidermoid carcinoma	1	
0444	2004	51	1	2	Adenoid Cystic carcinoma	5	
0445	2004	73	1	1	Pleomorphic adenoma	8	
0446	2004	27	2	1	Pleomorphic adenoma	2	
0447	2004	30	1	1	Pleomorphic adenoma	2	
0448	2004	50	2	1	Pleomorphic adenoma	2	
0449	2004	35	2	2	Adenoid Cystic carcinoma	2	
0450	2004	44	2	2	Adenocarcinoma low-grade	16	

0451	2004	35	2	1	Pleomorphic adenoma	1	
0452	2004	39	2	1	Pleomorphic adenoma	2	
0453	2004	62	2	1	Pleomorphic adenoma	2	
0454	2004	35	2	1	Pleomorphic adenoma	99	Palate
0455	2004	14	2	1	Pleomorphic adenoma	2	
0456	2004	37	2	1	Pleomorphic adenoma	1	
0457	2004	32	1	1	Pleomorphic adenoma	2	
0458	2004	32	1	1	Pleomorphic adenoma	17	
0459	2004	48	1	2	Carcinoma ex pleomorphic adenoma	1	
0460	2004	44	2	1	Pleomorphic adenoma	2	
0461	2004	18	1	1	Pleomorphic adenoma	2	
0462	2004	30	1	1	Pleomorphic adenoma	1	
0463	2004	49	2	2	Acinic cell carcinoma	1	
0464	2004	40	2	1	Pleomorphic adenoma	2	
0465	2004	27	1	2	Mucoepidermoid carcinoma	1	
0466	2004	47	2	1	Pleomorphic adenoma	2	
0467	2004	53	2	1	Pleomorphic adenoma	1	
0468	2004	54	2	2	Acinic cell carcinoma	7	
0469	2004	61	2	1	Pleomorphic adenoma	1	
0470	2004	40	2	1	Pleomorphic adenoma	5	
0471	2004	51	1	1	Pleomorphic adenoma	5	
0472	2004	63	1	1	Pleomorphic adenoma	2	
0473	2004	51	2	1	Pleomorphic adenoma	1	
0474	2004	58	1	1	Pleomorphic adenoma	1	
0475	2004	42	1	1	Pleomorphic adenoma	1	
0476	2004	19	2	1	Pleomorphic adenoma	2	
0477	2004		1	1	Pleomorphic adenoma	1	
0478	2004	31	1	1	Pleomorphic adenoma	1	
0479	2004	26	2	2	Myoepithelial carcinoma	1	
0480	2004	15	2	1	Pleomorphic adenoma	2	
0481	2004	51	1	1	Pleomorphic adenoma	2	
0482	2004	70	2	1	Pleomorphic adenoma	8	
0483	2004	56	2	1	Pleomorphic adenoma	1	
0484	2004	34	1	1	Pleomorphic adenoma	2	
0485	2004		1	1	Pleomorphic adenoma	2	
0486	2004	44	1	1	Pleomorphic adenoma	2	
0487	2004	25	1	1	Pleomorphic adenoma	2	
0488	2004	45	2	2	Mucoepidermoid carcinoma	2	
0489	2004	36	1	1	Pleomorphic adenoma	2	
0490	2004	26	1	2	Adenocarcinoma high grade	16	
0491	2004	22	1	1	Pleomorphic adenoma	99	
0492	2004	49	1	2	Mucoepidermoid carcinoma	99	Palate
0493	2004	64	1	2	Adenoid Cystic carcinoma	1	
0494	2004	57	2	1	Pleomorphic adenoma	1	
0495	2004	48	1	1	Pleomorphic adenoma	1	
0496	2004	74	2	1	Pleomorphic adenoma	15	
0497	2004	33	2	1	Pleomorphic adenoma	1	
0498	2004	34	2	1	Pleomorphic adenoma	17	
0499	2004	65	2	1	Pleomorphic adenoma	1	
0500	2004	27	1	2	Adenoid Cystic carcinoma	5	
0501	2004	52	2	1	Pleomorphic adenoma	1	
0502	2004	64	2	1	Pleomorphic adenoma	2	
0503	2004	65	2	1	Pleomorphic adenoma	99	Palate
0504	2004	45	2	2	Adenoid Cystic carcinoma	14	
0505	2004	74	1	2	Acinic cell carcinoma	1	
0506	2004	56	2	1	Pleomorphic adenoma	17	
0507	2004	21	1	1	Pleomorphic adenoma	2	
0508	2004	78	2	2	Mucoepidermoid carcinoma	1	
0509	2004	96	1	1	Pleomorphic adenoma	1	
0510	2004	45	2	2	Adenoid Cystic carcinoma	14	
0511	2004	23	2	2	Adenoid Cystic carcinoma	2	
0512	2004	65	2	1	Pleomorphic adenoma	99	Palate
0513	2004	67	1	1	Pleomorphic adenoma	99	Palate
0514	2004	51	2	2	Carcinoma ex pleomorphic adenoma	2	
0515	2004	39	1	1	Pleomorphic adenoma	1	

0516	2004	28	2	1	Pleomorphic adenoma	1	
0517	2004	27	1	2	Acinic cell carcinoma	1	
0518	2004	49	1	2	Adenocarcinoma low-grade	1	
0519	2004	64	2	2	Acinic cell carcinoma	1	
0520	2004	61	2	1	Pleomorphic adenoma	5	
0521	2005	45	1	1	Pleomorphic adenoma	5	
0522	2005	56	1	2	Adenoid Cystic carcinoma	14	
0523	2005	25	2	2	Mucoepidermoid carcinoma	14	
0524	2005	64	2	2	Acinic cell carcinoma	8	
0525	2005	83	1	2	Adenoid Cystic carcinoma	16	
0526	2005	52	2	1	Pleomorphic adenoma	5	
0527	2005	31	1	1	Pleomorphic adenoma	1	
0528	2005	49	1	1	Pleomorphic adenoma	5	
0529	2005	73	1	2	Acinic cell carcinoma	1	
0530	2005	11	2	2	Acinic cell carcinoma	8	
0531	2005	44	2	2	Mucoepidermoid carcinoma	9	
0532	2005	28	2	1	Pleomorphic adenoma	2	
0533	2005	25	1	1	Pleomorphic adenoma	5	
0534	2005	35	1	2	Mucoepidermoid carcinoma	99	Palate
0535	2005	50	2	2	Adenoid Cystic carcinoma	7	
0536	2005	39	1	2	Adenoid Cystic carcinoma	1	
0537	2005	31	2	1	Pleomorphic adenoma	2	
0538	2005	26	1	2	Myoepithelial carcinoma	1	
0539	2005	46	2	2	Adenoid Cystic carcinoma	5	
0540	2005	31	2	2	Adenoid Cystic carcinoma	5	
0541	2005	22	1	1	Pleomorphic adenoma	1	
0542	2005	31	2	2	Adenoid Cystic carcinoma	8	
0543	2005	73	2	1	Pleomorphic adenoma	6	
0544	2005	36	2	1	Pleomorphic adenoma	1	
0545	2005	27	2	1	Pleomorphic adenoma	1	
0546	2005	76	2	1	Pleomorphic adenoma	1	
0547	2005	25	1	1	Pleomorphic adenoma	1	
0548	2005	32	1	1	Pleomorphic adenoma	5	
0549	2005	31	2	1	Pleomorphic adenoma	2	
0550	2005	45	2	1	Pleomorphic adenoma	2	
0551	2005	50	2	1	Pleomorphic adenoma	1	
0552	2005	40	2	1	Pleomorphic adenoma	1	
0553	2005	50	1	1	Pleomorphic adenoma	1	
0554	2005	43	1	1	Pleomorphic adenoma	2	
0555	2005	57	2	2	Mucoepidermoid carcinoma	14	
0556	2005	80	1	1	Pleomorphic adenoma	2	
0557	2005	17	2	1	Pleomorphic adenoma	5	
0558	2005	54	2	2	Adenoid Cystic carcinoma	6	
0559	2005	35	2	1	Pleomorphic adenoma	1	
0560	2005	40	1	1	Pleomorphic adenoma	1	
0561	2005	65	2	1	Pleomorphic adenoma	1	
0562	2005	62	2	1	Pleomorphic adenoma	1	
0563	2005	63	2	2	Adenocarcinoma low-grade	7	
0564	2005	55	2	1	Pleomorphic adenoma	99	
0565	2005	47	2	1	Pleomorphic adenoma	99	parapharyngeal
0566	2005	46	2	1	Pleomorphic adenoma	1	
0567	2005	65	2	1	Canalicular adenoma	7	
0568	2005	42	2	1	Pleomorphic adenoma	99	
0569	2005	54	2	2	Mucoepidermoid carcinoma	99	Palate
0570	2005	32	2	2	Carcinoma ex pleomorphic adenoma	2	
0571	2005	60	1	2	Adenoid Cystic carcinoma	2	
0572	2005	28	2	1	Pleomorphic adenoma	1	
0573	2005	67	2	1	Pleomorphic adenoma	1	
0574	2005	49	1	1	Pleomorphic adenoma	6	
0575	2005	57	1	1	Pleomorphic adenoma	1	
0576	2005	79	2	1	Pleomorphic adenoma	99	
0577	2005	58	1	1	Pleomorphic adenoma	1	
0578	2005	54	2	2	Mucoepidermoid carcinoma	5	
0579	2005	28	1	1	Pleomorphic adenoma	1	
0580	2005	46	2	1	Pleomorphic adenoma	2	

0581	2005	60	2	1	Pleomorphic adenoma	2	
0582	2005	28	2	1	Pleomorphic adenoma	2	
0583	2005	62	2	2	Adenoid Cystic carcinoma	16	
0584	2005	53	2	2	Carcinoma ex pleomorphic adenoma	2	
0585	2005	67	2	1	Pleomorphic adenoma	99	Palate
0586	2005	43	2	1	Pleomorphic adenoma	8	
0587	2005	13	2	1	Pleomorphic adenoma	2	
0588	2005	83	1	2	Adenocarcinoma low-grade	99	Palate
0589	2005	67	2	1	Pleomorphic adenoma	99	Palate
0590	2005	53	2	1	Pleomorphic adenoma	2	
0591	2005	58	2	1	Pleomorphic adenoma	1	
0592	2005	50	1	1	Pleomorphic adenoma	1	
0593	2006	35	2	1	Pleomorphic adenoma	99	Palate
0594	2006	45	1	1	Pleomorphic adenoma	17	
0595	2006	35	2	2	Adenoid Cystic carcinoma	5	
0596	2006	73	2	2	Adenocarcinoma low-grade	5	
0597	2006	50	2	1	Pleomorphic adenoma	2	
0598	2006	12	2	1	Pleomorphic adenoma	99	Palate
0599	2006	40	2	2	Adenocarcinoma low-grade	16	
0600	2006	48	2	2	Adenocarcinoma low-grade	99	palate and cheek
0601	2006	16	1	1	Pleomorphic adenoma	1	
0602	2006	33	2	2	Mucoepidermoid carcinoma	7	
0603	2006	53	2	2	Adenoid Cystic carcinoma	16	
0604	2006	50	1	1	Pleomorphic adenoma	1	
0605	2006	28	2	2	Adenoid Cystic carcinoma	99	Palate
0606	2006	67	2		Pleomorphic adenoma	1	
0607	2006	66	1	2	Myoepithelial carcinoma	1	
0608	2006	24	2	1	Pleomorphic adenoma	8	
0609	2006	14	2	1	Pleomorphic adenoma	1	
0610	2006	35	1	1	Pleomorphic adenoma	8	
0611	2006	44	1	1	Pleomorphic adenoma	2	
0612	2006	36	2	1	Pleomorphic adenoma	1	
0613	2006	46	1	2	Mucoepidermoid carcinoma	1	
0614	2006	50	1	2	Mucoepidermoid carcinoma	1	
0615	2006	54	2	2	Adenocarcinoma low-grade	5	
0616	2006	16	2	1	Pleomorphic adenoma	2	
0617	2006	15	1	1	Pleomorphic adenoma	1	
0618	2006	47	2	2	Adenoid Cystic carcinoma	99	Face
0619	2006	32	2	2	Adenoid Cystic carcinoma	1	
0620	2006	55	2	2	Adenoid Cystic carcinoma	1	
0621	2006	39	2	1	Pleomorphic adenoma	99	palate
0622	2006	59	2	1	Pleomorphic adenoma	1	
0623	2006	22	2	1	Pleomorphic adenoma	2	
0624	2006	40	2	2	Adenoid Cystic carcinoma	7	
0625	2006	35	2	1	Pleomorphic adenoma	2	
0626	2006	63	1	1	Pleomorphic adenoma	1	
0627	2006	19	1	2	Mucoepidermoid carcinoma	1	
0628	2006	35	1	1	Warthin tumour	1	
0629	2006	55	2	1	Pleomorphic adenoma	1	
0630	2006	63	1	1	Pleomorphic adenoma	1	
0631	2006	25	1	1	Pleomorphic adenoma	6	
0632	2006	74	2	2	Adenoid Cystic carcinoma	2	
0633	2006	9	1	1	Pleomorphic adenoma	99	Palate
0634	2006	39	1	2	Mucoepidermoid carcinoma	1	
0635	2006	31	1	1	Pleomorphic adenoma	2	
0636	2006	46	1	1	Pleomorphic adenoma	1	
0637	2006	94	1	1	Pleomorphic adenoma	1	
0638	2006	44	1	1	Pleomorphic adenoma	99	Palate
0639	2006	44	2	2	Mucoepidermoid carcinoma	14	
0640	2006	27	1	1	Pleomorphic adenoma	1	
0641	2006	63	2	2	Adenoid Cystic carcinoma	2	
0642	2006	53	1	1	Warthin tumour	1	
0643	2006	44	1	1	Pleomorphic adenoma	5	
0644	2006	38	2	1	Pleomorphic adenoma	1	
0645	2006	11	2		Pleomorphic adenoma		

0646	2006	51	2	2	Adenoid Cystic carcinoma	5	
0647	2006	46	1	2	Mucoepidermoid carcinoma high grade	7	
0648	2006	36	1	2	Acinic cell carcinoma	2	
0649	2006	45	2	2	mucoepidermoid carcinoma	99	Palate
0650	2006	22	2	1	Pleomorphic adenoma	2	
0651	2006	64	1	1	Warthin tumour	1	
0652	2006	43	1	1	Pleomorphic adenoma	5	
0653	2006	52	2	1	Pleomorphic adenoma	1	
0654	2006	39	2	1	Pleomorphic adenoma	1	
0655	2006	73	1	2	Adenoid Cystic carcinoma	16	
0656	2006	43	2	2	Myoepithelial carcinoma	1	
0657	2006	19	2	2	Mucoepidermoid carcinoma	1	
0658	2006	67	2	2	Carcinoma ex pleomorphic adenoma	99	Palate
0659	2007	58	2	2	Adenocarcinoma low-grade	8	
0660	2007	13	2	1	Pleomorphic adenoma	5	
0661	2007	73	1	2	Mucoepidermoid carcinoma	1	
0662	2007	24	1	1	Pleomorphic adenoma	1	
0663	2007	51	2	1	Pleomorphic adenoma	2	
0664	2007	26	1	1	Pleomorphic adenoma	99	Palate to pharynx
0665	2007	66	2	2	Adenocarcinoma low-grade	8	
0666	2007	45	1	1	Pleomorphic adenoma	2	
0667	2007	52	2	2	Adenoid Cystic carcinoma	7	
0668	2007	66	1	1	Pleomorphic adenoma	1	
0669	2007	24	2	2	Adenoid Cystic carcinoma	16	
0670	2007	59	2	1	Pleomorphic adenoma	1	
0671	2007	49	1	1	Pleomorphic adenoma	1	
0672	2007	53	2	2	Adenoid Cystic carcinoma	16	
0673	2007	17	1	1	Pleomorphic adenoma	2	
0674	2007	27	2	1	Pleomorphic adenoma	2	
0675	2007	32	2	1	Pleomorphic adenoma	2	
0676	2007	28	1	1	Pleomorphic adenoma	1	
0677	2007	16	1	1	Pleomorphic adenoma	2	
0678	2007	25	2	2	Mucoepidermoid carcinoma low grade	1	
0679	2007	45	2	1	Pleomorphic adenoma	7	
0680	2007	34	2	1	Pleomorphic adenoma	1	
0681	2007	32	2	1	Pleomorphic adenoma	5	
0682	2007	28	2	1	Pleomorphic adenoma	1	
0683	2007	78	2	2	Myoepithelial carcinoma	1	
0684	2007	50	1	1	Pleomorphic adenoma	1	
0685	2007	41	1	1	Pleomorphic adenoma	1	
0686	2007	16	1	1	Pleomorphic adenoma	99	Palate
0687	2007	29	1	1	Pleomorphic adenoma	2	
0688	2007	69	1	1	Canalicular adenoma	8	
0689	2007	26	1	1	Pleomorphic adenoma	2	
0690	2007	57	2	2	Adenocarcinoma low-grade	7	
0691	2007	64	1	1	Basal cell carcinoma	99	Palate
0692	2007	30	2	1	Pleomorphic adenoma	5	
0693	2007	12	1	2	Acinic cell carcinoma	2	
0694	2007	47	1	2	Adenoid Cystic carcinoma	2	
0695	2007	64	1	1	Pleomorphic adenoma	2	
0696	2007	93	2	2	Adenocarcinoma	5	
0697	2007	47	2	2	Adenoid Cystic carcinoma	2	
0698	2007	49	2	1	Pleomorphic adenoma	1	
0699	2007	52	1	2	Adenocarcinoma low-grade	8	
0700	2007	62	1	2	Acinic cell carcinoma	1	
0701	2007	64	1	1	Pleomorphic adenoma	2	
0702	2007	58	2	1	Pleomorphic adenoma	1	
0703	2007	54	1	1	Pleomorphic adenoma	6	
0704	2007	66	2	1	Pleomorphic adenoma	1	
0705	2007	24	1	2	Adenocarcinoma ex pleomorphic adenoma	6	
0706	2007	49	1	1	Pleomorphic adenoma	2	
0707	2007		1	1	Pleomorphic adenoma	99	Palate
0708	2007	83	2	2	Adenocarcinoma low-grade	6	
0709	2007	24	1	1	Pleomorphic adenoma	99	Mouth
0710	2007	25	2	2	Adenoid Cystic carcinoma	5	

0711	2007	35	2	1	Pleomorphic adenoma	99	Palate
0712	2007	44	2	2	Mucoepidermoid carcinoma	2	
0713	2007	20	1	2	Mucoepidermoid carcinoma	1	
0714	2007	51	1	2	Acinic cell carcinoma	1	
0715	2007	24	1	1	Pleomorphic adenoma	99	Palate
0716	2007	23	2	1	Pleomorphic adenoma	6	
0717	2007	58	1	2	Adenocarcinoma high grade	1	
0718	2008	38	2	2	Adenoid Cystic carcinoma	16	
0719	2008	87	2	1	Pleomorphic adenoma	7	
0720	2008	33	2	1	Pleomorphic adenoma	99	Palate
0721	2008	44	2	1	Pleomorphic adenoma	2	
0722	2008	24	1	1	Pleomorphic adenoma	5	
0723	2008	48	1	2	Mucoepidermoid carcinoma	17	
0724	2008	53	2	2	Adenoid Cystic carcinoma	99	Palate
0725	2008	74	2	2	Mucoepidermoid carcinoma	5	
0726	2008	19	2	1	Pleomorphic adenoma	1	
0727	2008	57	2	1	Pleomorphic adenoma	1	
0728	2008	66	1	1	Warthin tumour	1	
0729	2008	22	2	1	Pleomorphic adenoma	1	
0730	2008	75	2	1	Pleomorphic adenoma	1	
0731	2008	46	1	1	Pleomorphic adenoma	99	Palate
0732	2008	25	1	1	Pleomorphic adenoma	7	
0733	2008	44	2	1	Pleomorphic adenoma	1	
0734	2008		2	1	Pleomorphic adenoma	1	
0735	2008	24	1	1	Pleomorphic adenoma	5	
0736	2008	53	2		Adenocarcinoma	5	
0737	2008	35	2	1	Pleomorphic adenoma	1	
0738	2008	35	2	2	Mucoepidermoid carcinoma	1	
0739	2008	14	1	2	Adenoid Cystic carcinoma	1	
0740	2008	36	2	1	Pleomorphic adenoma	5	
0741	2008	57	1	1	Pleomorphic adenoma	99	Palate
0742	2008	14	2	1	Pleomorphic adenoma	5	
0743	2008	17	2	1	Pleomorphic adenoma	5	
0744	2008	38	1	1	Pleomorphic adenoma	99	Chin
0745	2008	22	1	1	Pleomorphic adenoma	1	
0746	2008	56	2	1	Pleomorphic adenoma	2	
0747	2008	25	2	1	Pleomorphic adenoma	2	
0748	2008	31	1	1	Pleomorphic adenoma	1	
0749	2008	32	2	1	Pleomorphic adenoma	2	
0750	2008	32	1	1	Pleomorphic adenoma	99	Palate
0751	2008	24	1	1	Pleomorphic adenoma	2	
0752	2008	20	2	1	Pleomorphic adenoma	8	
0753	2008	19	2	1	Pleomorphic adenoma	2	
0754	2008	17	2	1	Pleomorphic adenoma	5	
0755	2008	54	1	1	Pleomorphic adenoma	2	
0756	2008	48	2	2	Adenoid Cystic carcinoma	2	
0757	2008	73	1	2	Sarcomatoid salivary duct carcinoma	1	
0758	2008	67	1	1	Pleomorphic adenoma	1	
0759	2008	27	2	1	Pleomorphic adenoma	99	Palate
0760	2008	19	1	1	Pleomorphic adenoma	1	
0761	2008	39	2	2	Mucoepidermoid carcinoma	1	
0762	2008	28	2	1	Pleomorphic adenoma	2	
0763	2008	32	1	1	Pleomorphic adenoma	99	Palate
0764	2008	53	1	1	Pleomorphic adenoma	5	
0765	2009	57	2	1	Pleomorphic adenoma	1	
0766	2009	45	1	1	Pleomorphic adenoma	1	
0767	2009	33	1	1	Pleomorphic adenoma	2	
0768	2009	26	2	1	Pleomorphic adenoma	2	
0769	2009	31	1	1	Pleomorphic adenoma	99	Palate
0770	2009	39	1	2	Mucoepidermoid carcinoma	5	
0771	2009	25	2	1	Pleomorphic adenoma	6	
0772	2009	65	1	1	Pleomorphic adenoma	2	
0773	2009	42	1	1	Pleomorphic adenoma	99	Palate
0774	2009	40	2	2	Mucoepidermoid carcinoma	99	Neck lump
0775	2009	44	2	2	Adenoid Cystic carcinoma	99	Palate

0776	2009	55	2	2	Adenocarcinoma low-grade	99	Palate
0777	2009	49	1	1	Pleomorphic adenoma	8	
0778	2009	62	1	1	Pleomorphic adenoma	1	
0779	2009	22	2	2	Mucoepidermoid carcinoma	14	
0780	2009	36	2	2	Adenocarcinoma low-grade		
0781	2009	35	2	1	Pleomorphic adenoma	7	
0782	2009	45	2	1	Pleomorphic adenoma	5	
0783	2009	61	1	1	Pleomorphic adenoma	1	
0784	2009	33	2	1	Pleomorphic adenoma	1	
0785	2009	31	1	1	Pleomorphic adenoma	99	Palate
0786	2009	61	1	1	Warthin tumour	1	
0787	2009	54	2	1	Mastoid adenoma	99	Mastoid adenoma
0788	2009	45	1	2	Adenoid Cystic carcinoma	5	
0789	2009	50	2	2	Acinic cell carcinoma	8	
0790	2009	26	1	2	Mucoepidermoid carcinoma	99	Palate
0791	2009	71	2	1	Pleomorphic adenoma	1	
0792	2009	38	2	2	Adenoid Cystic carcinoma	2	
0793	2009	21	1	1	Pleomorphic adenoma	6	
0794	2009	63	2	1	Canalicular adenoma	8	
0795	2009	19	2	1	Pleomorphic adenoma	2	
0796	2009	33	2	2	Mucoepidermoid carcinoma low grade		
0797	2009	15	2	1	Pleomorphic adenoma	5	
0798	2009	59	2	1	Canalicular adenoma	5	
0799	2009	25	2	1	Pleomorphic adenoma	1	
0800	2009	22	1	1	Apocrine papillary cystadenoma	7	
0801	2009	45	2	2	Adenocarcinoma low-grade	99	Neck mass
0802	2009	49	2	1	Pleomorphic adenoma	1	
0803	2009	68	2	1	Pleomorphic adenoma	2	
0804	2009	15	2	1	Pleomorphic adenoma	5	
0805	2009	42	1	1	Pleomorphic adenoma	5	
0806	2009	33	1	2	Adenoid Cystic carcinoma	17	
0807	2009	32	2	1	Pleomorphic adenoma	1	
0808	2009	28	2	1	Pleomorphic adenoma	1	
0809	2009	58	1	1	Pleomorphic adenoma	5	
0810	2009	88	2	2	Adenocarcinoma	2	
0811	2009	38	2		Myoepithelial carcinoma	16	
0812	2009	61	1	1	Warthin tumour	2	
0813	2009	60	1	2	Salivary ductal carcinoma	1	
0814	2009	57	1	1	Pleomorphic adenoma	5	
0815	2009	51	1	2	Carcinoma ex pleomorphic adenoma	1	
0816	2009	35	1	2	Adenoid Cystic carcinoma	13	
0817	2009	47	2	2	Adenocarcinoma	1	
0818	2009	39	2	2	Basal cell carcinoma	1	
0819	2009		1	2	Mucoepidermoid carcinoma	1	
0820	2009	59	2	1	Canalicular adenoma	6	
0821	2009	21	2	1	Pleomorphic adenoma	8	
0822	2009	31	2	1	Pleomorphic adenoma	8	
0823	2009	39	2	1	Pleomorphic adenoma	99	Face
0824	2009	34	2	1	Pleomorphic adenoma	99	Palate
0825	2009	27	2	1	Pleomorphic adenoma	1	
0826	2009	19	2	1	Pleomorphic adenoma	99	Palate
0827	2009	79	2	2	Adenocarcinoma low-grade	7	
0828	2009	27	2	2	Mucoepidermoid carcinoma	7	
0829	2009	33	2	1	Pleomorphic adenoma	1	
0830	2009		2	1	Pleomorphic adenoma	1	
0831	2009	27	1	1	Pleomorphic adenoma	1	
0832	2009	48	1	1	Canalicular adenoma	8	
0833	2009	46	2	1	Pleomorphic adenoma	1	
0834	2009	49	1	1	Pleomorphic adenoma	1	
0835	2010	25	2	2	Mucoepidermoid carcinoma	99	Palate
0836	2010	34	2	1	Pleomorphic adenoma	1	
0837	2010	45	2	1	Pleomorphic adenoma	1	
0838	2010	52	2	2	Mucoepidermoid carcinoma	6	
0839	2010	29	1	2	Acinic cell carcinoma	1	
0840	2010	82	1	1	Pleomorphic adenoma	1	

0841	2010	29	1	1	Pleomorphic adenoma	2	
0842	2010	19	1	1	Pleomorphic adenoma	2	
0843	2010	38	2	1	Pleomorphic adenoma	7	
0844	2010	61	1	1	Pleomorphic adenoma	5	
0845	2010	42	2	1	Pleomorphic adenoma	1	
0846	2010	27	2	1	Pleomorphic adenoma	2	
0847	2010	24	2	2	Mucoepidermoid carcinoma	5	
0848	2010	61	1	2	Adenoid Cystic carcinoma	2	
0849	2010	22	2	2	Mucoepidermoid carcinoma	99	Palate
0850	2010	54	1	1	Pleomorphic adenoma	2	
0851	2010	34	1	2	Adenocarcinoma	99	Palate
0852	2010	51	2	1	Pleomorphic adenoma	15	
0853	2010	29	1	2	Acinic cell carcinoma	1	
0854	2010	64	2	1	Pleomorphic adenoma	1	
0855	2010	24	1	1	Pleomorphic adenoma	15	
0856	2010	23	2	1	Pleomorphic adenoma	1	
0857	2010	26	1	1	Pleomorphic adenoma	7	
0858	2010	37	1	2	Mucoepidermoid carcinoma	1	
0859	2010	29	1	1	Pleomorphic adenoma	99	Palate
0860	2010	35	2	1	Pleomorphic adenoma	8	
0861	2010	16	2	1	Pleomorphic adenoma	2	
0862	2010	57	1	1	Pleomorphic adenoma	1	
0863	2010	43	2	1	Pleomorphic adenoma	1	
0864	2010	38	2	1	Pleomorphic adenoma	1	
0865	2010	40	1	1	Pleomorphic adenoma	2	
0866	2010	31	2	1	Pleomorphic adenoma	1	
0867	2010	42	1	2	Adenoid Cystic carcinoma	15	
0868	2010	69	2	1	Warthin tumour	1	
0869	2010	51	2	1	Pleomorphic adenoma	5	
0870	2010	54	2	1	Pleomorphic adenoma	2	
0871	2010	59	1	1	Pleomorphic adenoma	1	
0872	2010	58	1	1	Pleomorphic adenoma	6	
0873	2010	36	2	2	Adenocarcinoma low-grade	7	
0874	2010	54	1	1	Pleomorphic adenoma	1	
0875	2010	23	2	1	Pleomorphic adenoma	5	
0876	2010	19	2	1	Pleomorphic adenoma	1	
0877	2010	34	2	1	Pleomorphic adenoma	1	
0878	2010	32	1	1	Pleomorphic adenoma	1	
0879	2010	26	1	1	Pleomorphic adenoma	99	Palate
0880	2010	39	2	1	Pleomorphic adenoma	2	
0881	2010	34	2	1	Pleomorphic adenoma	1	
0882	2010	68	2	2	Adenocarcinoma low-grade	15	
0883	2010	27	1	1	Pleomorphic adenoma	1	
0884	2010	38	1	1	Pleomorphic adenoma	99	Palate
0885	2010	59	1	2	Mucoepidermoid carcinoma	10	
0886	2010	30	2	1	Pleomorphic adenoma	1	
0887	2010	59	1	1	Warthin tumour	1	
0888	2010	30	2	1	Pleomorphic adenoma	1	
0889	2010	54	1	1	Pleomorphic adenoma	2	
0890	2010	20	2	1	Pleomorphic adenoma	99	Palate
0891	2010	57	2	1	Pleomorphic adenoma	2	
0892	2010	33	2	1	Pleomorphic adenoma	99	Palate
0893	2010	64	1	2	Carcinoma ex pleomorphic adenoma	1	
0894	2011	12	2	1	Pleomorphic adenoma	8	
0895	2011	28	1	1	Pleomorphic adenoma	2	
0896	2011	58	2	2	Acinic cell carcinoma	1	
0897	2011	25	2	2	Mucoepidermoid carcinoma low grade	1	
0898	2011	38	2	2	Acinic cell carcinoma	1	
0899	2011	29	1	1	Pleomorphic adenoma	1	
0900	2011	74	1	1	Canalicular adenoma	8	
0901	2011	29	2	1	Pleomorphic adenoma	99	
0902	2011	61	2	2	Myoepithelial carcinoma	1	
0903	2011	52	1	1	Pleomorphic adenoma	5	
0904	2011	68	1	2	Acinic cell carcinoma	7	
0905	2011	34	2	2	Acinic cell carcinoma	1	

0906	2011	55	2	2	Adenocarcinoma	15	
0907	2011	43	2	1	Pleomorphic adenoma	14	
0908	2011	22	2	1	Pleomorphic adenoma	5	
0909	2011	12	2	1	Pleomorphic adenoma	2	
0910	2011	59	2	2	Adenoid Cystic carcinoma	14	
0911	2011	60	1	1	Pleomorphic adenoma	1	
0912	2011	31	1	2	Adenoid Cystic carcinoma	1	
0913	2011	29	1	1	Pleomorphic adenoma	1	
0914	2011	57	2	1	Pleomorphic adenoma	1	
0915	2011	68	2	2	Carcinoma ex pleomorphic adenoma	1	
0916	2011	51	2	2	Mucoepidermoid carcinoma	1	
0917	2011	49	1	1	Pleomorphic adenoma	1	
0918	2011	51	2	2	Carcinoma ex pleomorphic adenoma	2	
0919	2011	71	1	2	Polymorphous low grade adenocarcinoma	99	Hard palate / nasal cavity
0920	2011	29	2	1	Pleomorphic adenoma	99	Palate
0921	2011	57	1	1	Warthin tumour	1	
0922	2011	65	2	1	Pleomorphic adenoma	1	
0923	2011	27	2	1	Pleomorphic adenoma	2	
0924	2011	41	2	2	Mucoepidermoid carcinoma	5	
0925	2011	70	2	1	Pleomorphic adenoma	1	
0926	2011	53	1	1	Pleomorphic adenoma	8	
0927	2011	29	1	1	Pleomorphic adenoma	1	
0928	2011	33	2	1	Pleomorphic adenoma	5	
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0930	2011	33	1	1	Pleomorphic adenoma	7	
0931	2011	30	1	1	Pleomorphic adenoma	8	
0932	2011	22	1	1	Pleomorphic adenoma	15	
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0934	2011	35	2	1	Pleomorphic adenoma	5	
0935	2011	70	2	1	Warthin tumour	1	
0936	2011	9	2	1	Pleomorphic adenoma	2	
0937	2011	54	1	2	Carcinoma ex pleomorphic adenoma	2	
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0943	2011	48	2	1	Pleomorphic adenoma	1	
0944	2011	51	1	1	Pleomorphic adenoma	1	
0945	2011	72	2	2	Adenocarcinoma low-grade	15	
0946	2011	12	2	2	Acinic cell carcinoma	2	
0947	2011	29	2	1	Pleomorphic adenoma	2	
0948	2011	57	1	1	Pleomorphic adenoma	1	
0949	2011	37	2	2	Acinic cell carcinoma	17	
0950	2011	29	2	1	Pleomorphic adenoma	1	
0951	2011	44	1	2	Mucoepidermoid carcinoma	1	
0952	2011	13	1	2	Acinic cell carcinoma	7	
0953	2011	80	1	2	Adenocarcinoma low-grade	17	
0954	2011	33	2	2	Mucoepidermoid carcinoma	1	
0955	2011	64	1	2	Adenocarcinoma low-grade	6	
0956	2011	37	1	1	Pleomorphic adenoma	1	
0957	2011	45	2	1	Pleomorphic adenoma	5	
0958	2011	12	2	1	Pleomorphic adenoma	5	
0959	2011	48	2	1	Pleomorphic adenoma	2	
0960	2012	66	1	2	Adenocarcinoma low-grade	5	
0961	2012	37	2	2	Mucoepidermoid carcinoma	6	
0962	2012	73	2	1	Oncocytic papillary cystadenoma	99	Larynx
0963	2012	45	1	2	Carcinoma ex pleomorphic adenoma	7	
0964	2012	53	2	1	Warthin tumour	1	
0965	2012	48	2	1	Pleomorphic adenoma	5	
0966	2012	52	2	1	Pleomorphic adenoma	1	
0967	2012	19	2		Pleomorphic adenoma	1	
0968	2012	30	2	1	Pleomorphic adenoma	1	
0969	2012	46	1	1	Pleomorphic adenoma	2	
0970	2012	67	2	2	Epithelial myoepithelial carcinoma	1	

0971	2012	32	1	1	Pleomorphic adenoma	1	
0972	2012	16	2	1	Pleomorphic adenoma	1	
0973	2012	31	1	1	Pleomorphic adenoma	5	
0974	2012	47	2	2	Adenoid Cystic carcinoma	13	
0975	2012	27	2	1	Pleomorphic adenoma	8	
0976	2012	43	2	1	Pleomorphic adenoma	1	
0977	2012	45	2	1	Pleomorphic adenoma	8	
0978	2012	37	1	1	Pleomorphic adenoma	2	
0979	2012	78	2	2	Adenoid Cystic carcinoma	5	
0980	2012	49	1	1	Pleomorphic adenoma	2	
0981	2012	58	2	2	Adenoid Cystic carcinoma	15	
0982	2012	81	1	2	Adenocarcinoma low-grade	10	
0983	2012	22	2	1	Pleomorphic adenoma	1	
0984	2012	37	2	1	Pleomorphic adenoma	99	Palatal mass
0985	2012	36	1	1	Pleomorphic adenoma	1	
0986	2012	58	2	1	Pleomorphic adenoma	1	
0987	2012	56	1	1	Pleomorphic adenoma	1	
0988	2012	55	2	1	Pleomorphic adenoma	5	
0989	2012	37	2	2	Adenoid Cystic carcinoma	5	
0990	2012	60	2	2	Adenoid Cystic carcinoma	11	
0991	2012	53	1	1	Pleomorphic adenoma	1	
0992	2012	60	2	2	Polymorphous low grade carcinoma	7	
0993	2012	30	2	2	Polymorphous low grade adenocarcinoma	5	
0994	2012	33	2	2	Mucoepidermoid carcinoma	1	
0995	2012	67	2	2	Invasive myoepithelial carcinoma	1	
0996	2012	64	2	2	Carcinoma ex pleomorphic adenoma	1	
0997	2012	31	2	1	Pleomorphic adenoma	2	
0998	2012	27	2	1	Pleomorphic adenoma	1	
0999	2012	23	2	1	Pleomorphic adenoma	2	
1000	2012	37	2	2	Mucoepidermoid carcinoma high grade	99	Hard and soft palate
1001	2012	18	1	1	Pleomorphic adenoma	5	
1002	2012	38	2	1	Pleomorphic adenoma	6	
1003	2012	42	2	1	Pleomorphic adenoma	2	
1004	2012	54	2	1	Pleomorphic adenoma	1	
1005	2012	37	2	2	Mucoepidermoid carcinoma	5	
1006	2012	20	1	1	Pleomorphic adenoma	2	
1007	2012	28	2	1	Pleomorphic adenoma	1	
1008	2012	38	1	1	Pleomorphic adenoma	6	
1009	2012	31	2	1	Pleomorphic adenoma	2	
1010	2012	23	1	1	Pleomorphic adenoma	2	
1011	2012	49	2	1	Pleomorphic adenoma	1	
1012	2012	29	2	2	Mucoepidermoid carcinoma	5	
1013	2012	49	2	1	Pleomorphic adenoma	1	
1014	2012	36	1	1	Pleomorphic adenoma	99	Neck
1015	2012	66	2	2	Adenoid Cystic carcinoma	5	
1016	2012	26	1	1	Pleomorphic adenoma	99	
1017	2012	40	2	1	Pleomorphic adenoma	2	
1018	2012	36	2	1	Pleomorphic adenoma	5	
1019	2012	43	1	1	Pleomorphic adenoma	99	Palate
1020	2012	53	1	1	Pleomorphic adenoma	99	
1021	2012	28	1	2	Acinic cell carcinoma	2	
1022	2012	66	1	1	Pleomorphic adenoma	1	
1023	2012	30	2	2	Adenocarcinoma low-grade	99	Palate
1024	2012	34	1	1	Pleomorphic adenoma	2	
1025	2012	48	2	2	Mucoepidermoid carcinoma low grade	1	
1026	2012	28	2	1	Pleomorphic adenoma	2	
1027	2012	58	1	2	Mucoepidermoid carcinoma	99	Larynx
1028	2012	31	2	1	Pleomorphic adenoma	1	
1029	2012	26	2	1	Pleomorphic adenoma	2	
1030	2012	53	2	2	Carcinoma ex pleomorphic adenoma	1	
1031	2012	79	1	2	Mucoepidermoid carcinoma	1	
1032	2013	47	2	2	Mucoepidermoid carcinoma	7	
1033	2013	67	2	1	Pleomorphic adenoma	1	
1034	2013	48	2	2	Mucoepidermoid carcinoma	2	
1035	2013	14	2	1	Pleomorphic adenoma	99	Palate

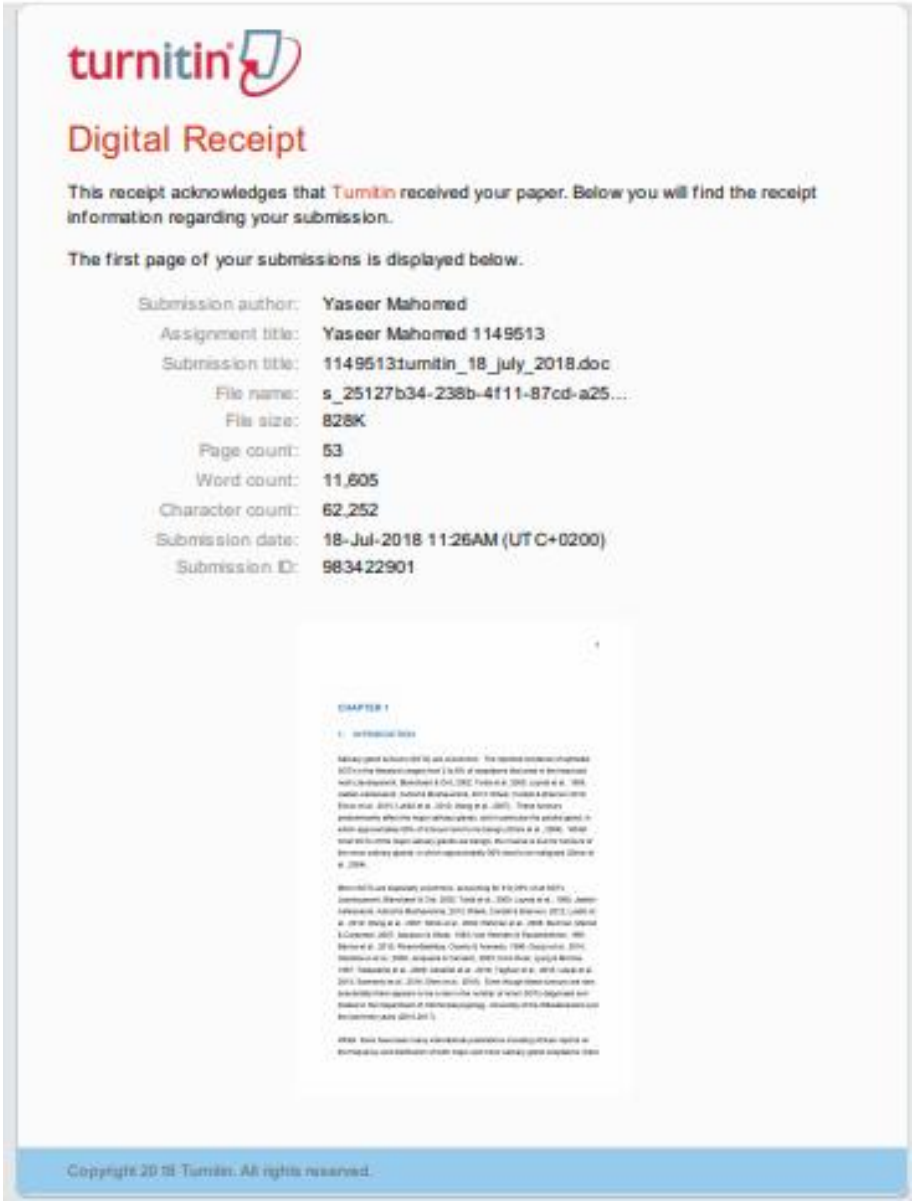
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1039	2013	22	1	1	Pleomorphic adenoma	99	Palate
1040	2013	61	2	2	Acinic cell carcinoma	7	
1041	2013	46	2	2	Adenoid Cystic carcinoma	15	
1042	2013	48	2	2	Mucoepidermoid carcinoma	14	
1043	2013	47	2		Mucoepidermoid carcinoma	7	
1044	2013	28	2	1	Pleomorphic adenoma	1	
1045	2013	29	2	1	Pleomorphic adenoma	1	
1046	2013	68	1	1	Pleomorphic adenoma	5	
1047	2013	10	2	2	Acinic cell carcinoma	1	
1048	2013	44	1	1	Pleomorphic adenoma	1	
1049	2013	54	2	1	Pleomorphic adenoma	12	
1050	2013	28	2	1	Pleomorphic adenoma	1	
1051	2013	21	2	1	Pleomorphic adenoma	1	
1052	2013	32	2	1	Pleomorphic adenoma	1	
1053	2013	64	2	1	Pleomorphic adenoma	1	
1054	2013	40	1	2	Carcinoma ex pleomorphic adenoma	1	
1055	2013	20	2	2	Mucoepidermoid carcinoma	99	Maxilla
1056	2013	24	2	1	Pleomorphic adenoma	2	
1057	2013	38	2	1	Pleomorphic adenoma	1	
1058	2013	70	2	1	Pleomorphic adenoma	1	
1059	2013	14	2	1	Pleomorphic adenoma	5	
1060	2013	57	2	2	Adenoid Cystic carcinoma	15	
1061	2013	20	2	1	Pleomorphic adenoma	2	
1062	2013	55	2	1	Pleomorphic adenoma	2	
1063	2013	27	2	1	Pleomorphic adenoma	2	
1064	2013	10	2	1	Pleomorphic adenoma	2	
1065	2013	84	2	2	Adenocarcinoma low-grade	7	
1066	2013	30	2	2	Acinic cell carcinoma	1	
1067	2013	40	1	1	Pleomorphic adenoma	1	
1068	2013	30	1	2	Acinic cell carcinoma	7	
1069	2013	34	1	2	Mucoepidermoid carcinoma	1	
1070	2013	46	2	1	Pleomorphic adenoma	1	
1071	2013	52	2	1	Pleomorphic adenoma	15	
1072	2013	19	1	1	Pleomorphic adenoma	99	Palate
1073	2013	50	2	2	Carcinoma ex pleomorphic adenoma	99	Maxilla
1074	2013	46	2	1	Pleomorphic adenoma	99	Hard and soft palate
1075	2013	78	1	1	Pleomorphic adenoma	1	
1076	2013	53	1	1	Pleomorphic adenoma	2	
1077	2013	31	1	1	Pleomorphic adenoma	6	
1078	2013	40	2	1	Pleomorphic adenoma	1	
1079	2013	29	2	2	Acinic cell carcinoma	1	
1080	2013	20	1	1	Pleomorphic adenoma	2	
1081	2013		1	1	Pleomorphic adenoma	99	Palate
1082	2013	49	2	1	Pleomorphic adenoma	1	
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1087	2013	45	2	1	Pleomorphic adenoma	1	
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1095	2013	51	1	1	Pleomorphic adenoma	1	
1096	2013	75	2	1	Cystadenoma	99	Larynx
1097	2013	33	1	2	Acinic cell adenocarcinoma	1	
1098	2013	30	1	1	Pleomorphic adenoma	1	
1099	2013	26	1	2	Carcinoma ex pleomorphic adenoma	99	Maxilla
1100	2013	47	1	1	Pleomorphic adenoma	1	

1101	2013	40	2	1	Pleomorphic adenoma	1	
1102	2013	31	1	1	Pleomorphic adenoma	99	Maxilla
1103	2013	24	1	1	Pleomorphic adenoma	1	
1104	2013	34	1	1	Pleomorphic adenoma	99	Palate
1105	2013	34	1	1	Pleomorphic adenoma	6	
1106	2013	61	2	2	Adenoid Cystic carcinoma	10	
1107	2013	70	1	1	Pleomorphic adenoma	1	
1108	2013	55	2	2	Acinic cell carcinoma	1	
1109	2014	20	2	1	Pleomorphic adenoma	8	
1110	2014	37	1	2	Acinic cell adenocarcinoma	1	
1111	2014	30	1	1	Pleomorphic adenoma	6	
1112	2014	40	1	1	Pleomorphic adenoma	2	
1113	2014	19	2	1	Pleomorphic adenoma	8	
1114	2014	57	2	2	Adenoid Cystic carcinoma	15	
1115	2014	45	1	1	Pleomorphic adenoma	7	
1116	2014	70	2	1	Pleomorphic adenoma	99	Palate
1117	2014	42	1	2	Adenoid Cystic carcinoma	2	
1118	2014	62	2	1	Pleomorphic adenoma	7	
1119	2014	41	1	1	Pleomorphic adenoma	1	
1120	2014	65	2	1	Pleomorphic adenoma	99	Palate
1121	2014	27	2	1	Pleomorphic adenoma	99	Palate
1122	2014	70	1	1	Pleomorphic adenoma	5	
1123	2014	62	1	1	Pleomorphic adenoma	99	Palate
1124	2014	42	2	1	Pleomorphic adenoma	5	
1125	2014	31	1	1	Pleomorphic adenoma	6	
1126	2014	58	2	1	Pleomorphic adenoma	1	
1127	2014	44	1	2	Mucoepidermoid carcinoma	99	Palate
1128	2014	74	2	1	Canalicular adenoma	8	
1129	2014	31	1	1	Pleomorphic adenoma	99	Palate
1130	2014	34	1	1	Pleomorphic adenoma	5	
1131	2014	20	2	2	Mucoepidermoid carcinoma	99	Palate
1132	2014	16	2	1	Pleomorphic adenoma	5	
1133	2014	54	1	2	Salivary gland adenocarcinoma	99	Palate
1134	2014	46	2	2	Mucoepidermoid carcinoma	7	
1135	2014	26	2	1	Pleomorphic adenoma	5	
1136	2014	71	2	2	Myoepithelial carcinoma	99	Palate
1137	2014	46	2	1	Pleomorphic adenoma	5	
1138	2014	25	2	1	Pleomorphic adenoma	7	
1139	2014	43	2	1	Pleomorphic adenoma	2	
1140	2014	21	2	1	Pleomorphic adenoma	1	
1141	2014	35	2	2	Cystadenocarcinoma	1	
1142	2014	58	2	2	Adenocarcinoma low-grade	7	
1143	2014	58	2	1	Pleomorphic adenoma	99	Palate
1144	2014	24	2	2	Acinic cell carcinoma	7	
1145	2014	20	1	1	Pleomorphic adenoma	1	
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1147	2014	53	1	2	Acinic cell carcinoma	1	
1148	2014	47	2	1	Pleomorphic adenoma	1	
1149	2014	61	2	1	Pleomorphic adenoma	7	
1150	2014	53	2	2	Adenocarcinoma low-grade	99	Palate
1151	2015	29	2	2	Mucoepidermoid carcinoma	99	Palate
1152	2015	39	2	1	Pleomorphic adenoma	15	
1153	2015	47	1	1	Pleomorphic adenoma	2	
1154	2015	29	2	1	Pleomorphic adenoma	99	Palate
1155	2015	26	2	1	Pleomorphic adenoma	2	
1156	2015	52	2	1	Pleomorphic adenoma	1	
1157	2015	36	1	2	Mucoepidermoid carcinoma	1	
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1161	2015	46	2	1	Pleomorphic adenoma	1	
1162	2015	56	2	1	Pleomorphic adenoma	99	Palate
1163	2015	39	2	1	Pleomorphic adenoma	15	
1164	2015	56	1	1	Pleomorphic adenoma	1	
1165	2015	75	2		Pleomorphic adenoma	1	

1166	2015	26	1	1	Pleomorphic adenoma	1	
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1168	2015	13	1	1	Pleomorphic adenoma	2	
1169	2015	44	1	1	Pleomorphic adenoma	2	
1170	2015	49	1	1	Pleomorphic adenoma	1	
1171	2015	31	1	1	Pleomorphic adenoma	1	
1172	2015	39	2	1	Pleomorphic adenoma	1	
1173	2015	78	1	2	Carcinoma ex pleomorphic adenoma	2	
1174	2015	21	1	2	Mucoepidermoid carcinoma	1	
1175	2015	40	1	1	Pleomorphic adenoma	1	
1176	2015	8	2	1	Pleomorphic adenoma	2	
1177	2015	50	1	1	Pleomorphic adenoma	5	
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1179	2015	28	2	1	Pleomorphic adenoma	5	
1180	2015	13	1	1	Pleomorphic adenoma	2	
1181	2015	53	1	1	Pleomorphic adenoma	2	
1182	2015	53	1	2	Mucoepidermoid carcinoma	1	
1183	2015	48	2	1	Pleomorphic adenoma	1	
1184	2015	48	2	1	Pleomorphic adenoma	2	
1185	2015	68	2	1	Pleomorphic adenoma	2	
1186	2015	26	1	1	Pleomorphic adenoma	99	Hard and soft palate
1187	2015	54	2	1	Pleomorphic adenoma	1	
1188	2015	32	2	2	Myoepithelial carcinoma	15	
1189	2015	32	1	1	Pleomorphic adenoma	5	
1190	2015	27	2	1	Pleomorphic adenoma	2	
1191	2015	30	2	1	Pleomorphic adenoma	1	
1192	2015	46	2	1	Pleomorphic adenoma	1	
1193	2015	72	1	1	Pleomorphic adenoma	99	Hard and soft palate
1194	2015	53	2	1	Pleomorphic adenoma	5	
1195	2015	88	1	2	Ductal adenocarcinoma	1	
1196	2015	61	2	2	Adenoid Cystic carcinoma	16	
1197	2015	62	2	1	Pleomorphic adenoma	99	Palate
1198	2015	29	1	1	Pleomorphic adenoma	5	
1199	2015	32	2	2	Myoepithelial carcinoma	5	
1200	2015	71	1	1	Pleomorphic adenoma	99	Maxilla
1201	2015	46	1	1	Warthin tumour	1	
1202	2015	17	2	1	Pleomorphic adenoma	1	
1203	2015	66	2	2	Acinic cell carcinoma	1	
1204	2015	34	2	1	Pleomorphic adenoma	1	
1205	2015	55	2	1	Pleomorphic adenoma	1	
1206	2015	34	2	2	Adenoid Cystic carcinoma	2	
1207	2015	39	2	1	Pleomorphic adenoma	1	
1208	2015	44	2	2	Mucoepidermoid carcinoma	5	
1209	2015	63	2	2	Adenocarcinoma low-grade	7	
1210	2015	38	2	1	Pleomorphic adenoma	1	
1211	2015	56	2	2	Adenocarcinoma	7	
1212	2015	61	2	2	Adenoid Cystic carcinoma	99	Palate
1213	2015	41	2	2	Myoepithelial carcinoma	5	
1214	2015	20	2	2	Mucoepidermoid carcinoma	99	Palate
1215	2015	25	1	1	Pleomorphic adenoma	8	
1216	2015	16	1	1	Pleomorphic adenoma	8	
1217	2015	39	1	2	Mucoepidermoid carcinoma	1	
1218	2015	62	2	1	Pleomorphic adenoma	99	Palate
1219	2015	13	1	2	Mucoepidermoid carcinoma	1	
1220	2015	62	2	1	Pleomorphic adenoma	8	
1221	2015	30	2	1	Pleomorphic adenoma	2	
1222	2015	42	1	1	Pleomorphic adenoma	1	
1223	2016	67	2	1	Pleomorphic adenoma	5	
1224	2016	21	1	1	Pleomorphic adenoma	2	
1225	2016	65	1	2	High grade salivary duct carcinoma	1	
1226	2016	33	2	1	Pleomorphic adenoma	2	
1227	2016	52	1	2	High grade epithelial myoepithelial carcinoma	99	
1228	2016	34	2	1	Polymorphous low grade adenoma	5	
1229	2016	58	1	1	Warthin tumour	1	
1230	2016	31	1	1	Pleomorphic adenoma	1	

1231	2016	42	2	1	Pleomorphic adenoma	2	
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1235	2016	30	1	2	Acinic cell carcinoma	8	
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1237	2016	49	2	2	Adenoid Cystic carcinoma (Solid Variant)	99	Palate
1238	2016	74	1	1	Pleomorphic adenoma	6	
1239	2016	46	2	1	Pleomorphic adenoma	1	
1240	2016	18	2	1	Pleomorphic adenoma	7	
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1242	2016	25	2	1	Pleomorphic adenoma	1	
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1244	2016	32	1	1	Pleomorphic adenoma	2	
1245	2016	35	1	1	Warthin tumour	1	
1246	2016	40	2	1	Pleomorphic adenoma	6	
1247	2016	37	1	2	Carcinoma ex pleomorphic adenoma	99	Palate / nasal cavity
1248	2016	19	1	1	Pleomorphic adenoma	2	
1249	2016	47	2	1	Pleomorphic adenoma	1	
1250	2016	63	2	1	Pleomorphic adenoma	6	
1251	2016	76	2	1	Pleomorphic adenoma	2	
1252	2016	37	2	2	Adenoid cystic carcinoma	1	
1253	2016	50	2	2	Acinic cell carcinoma	7	
1254	2016	28	2	2	Myoepithelial Carcinoma ex pleomorphic adenoma		
1255	2016	37	1	1	Pleomorphic adenoma	5	
1256	2016	43	2	2	Adenoid cystic carcinoma	5	
1257	2016	45	2	1	Pleomorphic adenoma	1	
1258	2016	60	1	2	Infiltrating salivary gland adenocarcinoma	7	
1259	2016	57	2	1	Pleomorphic adenoma	1	
1260	2016	69	2	1	Warthin tumour	1	
1261	2016	27	2	1	Pleomorphic adenoma	1	
1262	2016	39	2	1	Pleomorphic adenoma	99	Palate
1263	2016	65	1	1	Pleomorphic adenoma	2	
1264	2016	22	2	2	Adenoid cystic carcinoma	5	
1265	2016	39	1	1	Pleomorphic adenoma	2	
1266	2016	27	2	1	Pleomorphic adenoma	2	
1267	2016	76	2	1	Canalicular adenoma	7	
1268	2016	31		1	Pleomorphic adenoma	2	
1269	2016	68	1	1	Pleomorphic adenoma	1	
1270	2016	47	2	1	Pleomorphic adenoma	1	
1271	2016	49	1	1	Pleomorphic adenoma	1	
1272	2016	79	1	2	Carcinoma ex pleomorphic adenoma	2	
1273	2016	35	2	1	Pleomorphic adenoma	1	
1274	2016	22	2	1	Pleomorphic adenoma	1	
1275	2016	35	1	2	Mucoepidermoid carcinoma low grade	1	

APPENDIX D: TURNITIN REPORT



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