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Reasons for tooth loss in Blacks on the Witwatersrand

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SUMMARY

Reasons for tooth loss is a crude index of the dental health of a community, and was determined in a sample of 600 Blacks on the Witwatersrand. Dental caries with or without concurrent pathology was responsible for 67 per cent of tooth loss, periodontal disease for 19 per cent, trauma for 5 per cent, impacted teeth for 3 per cent and prosthetic reasons for 2 per cent. Dental caries was the most common reason for tooth loss in all age groups except for the group over 65 years where periodontal disease was most common.

OPSOMMING

'Rede vir tandverlies' is gebruik as 'n growwe bepaling van die mond- en tandgesondheidstoestand van 600 Swart persone in die Witwatersrand. Tandkaries, met of sonder gepaardgaande patologiese veranderinge, was vir 67 persent van ekstraksies verantwoordelik terwyl periodontale siektes vir 19 persent, trauma vir 5 persent, geïmpakteerde tande vir 3 persent en prostetiese oorweginge vir 2 persent gegeld het. Karies was die enkel mees algemene rede van tandverlies tot ouderdom van 65 jaar waarna periodontale siektes die hoofoorsaak was.

INTRODUCTION

A review of the literature indicated that at least 16 studies have been undertaken to determine reasons for tooth extraction. The first of these was carried out by Brekhus in the United States of America in 1929. The well-documented investigations are listed in Table 1 and have showed that dental caries was generally the most common cause of tooth loss. The prevalences and method of reporting, however, varied from study to study. No such investigation has been undertaken in South Africa. The present study was undertaken to assess the reasons for tooth loss in a sample of the Black population living or working on the Witwatersrand and to define a baseline for later comparative studies.

Table 1:
PREVIOUS TOOTH EXTRACTION STUDIES IN CHRONOLOGICAL ORDER

COUNTRY	AUTHOR	YEAR OF STUDY
USA	Allen	1944
USA	Krough	1958
USA	Miller	1958
India	Mehta *et al*	1958
New Zealand	Coxhead	1960
USA	Grewe, Gorlin and Meskin	1966
Canada	Trott and Cross	1966
Denmark	Bay and Gad	1967
Sweden	Lundqvist	1967
Norway	Johansen	1970
South Australia	Evans and Cellier	1970
New Zealand	Barclay	1974
South Australia	Roder	1975
South Australia	Johansen and Johansen	1977

MATERIAL AND METHODS

A total of 600 subjects were included in this study. They attended dental clinics at Baragwanath Hospital, Hillbrow Hospital, central Soweto, a private practice in Johannesburg and the Oral and Dental Teaching Hospital of the Witwatersrand. The study extended over winter and summer months, with an almost equal spread over the entire period.

'Blacks', in this study refer to the South African blacks of Negroid origin. "On the Witwatersrand" refers to the people living in an area encompassing and including 2 major cities adjacent to each other, namely Johannesburg and Soweto. Some of the subjects examined may have been born in the area, others may be migrant workers temporarily domiciled there and others came from beyond the municipal boundaries of these two cities.

In order to standardize the study, strict guidelines were employed to delineate the ultimate reason for tooth extraction. In instances where there were a combination of reasons, the aetiology that caused the pain for which the patient sought relief was the one that was recorded. In those instances where there was no means of isolating the immediate cause of the pain both disease processes were noted.

The main reasons for tooth extraction in this study can be defined as follows:

1. **Dental Caries**
   This group included patients who wished to have a tooth removed with a carious lesion with or without acute periapical pathology. Acute periapical pathology was defined as the condition which existed when

a rapid withdrawal reflex of the jaw occurred following 3 or fewer gentle percussions of a dental mirror handle on the affected tooth. Dental caries was found to occur in combination with other related pathologies such as for example periapical pathology, periodontal disease or impaction. If any of these pathologies were present together with dental caries on the teeth to be extracted, they were grouped with the dental caries group.

2. **Periodontal Disease**
   This group included teeth with an acute periodontal abscess or teeth with chronic periodontal disease. It was difficult in some cases to determine whether the reason for requesting extraction was periodontal disease or prosthetic. When the patient expressed the desire to have periodontally involved teeth extracted and a denture constructed the reason for tooth extraction was recorded as periodontal disease.
3. **Trauma**
   These patients received trauma to either the teeth, alveolar bone or both. The trauma in by far the majority of cases was assault.
4. **Prosthetic Reasons**
   This group included those patients referred from other departments or practitioners for the extraction of asymptomatic teeth, which were preventing the construction of a sound prosthesis. Patients, in the absence of symptoms, requesting extraction for the purpose of constructing a prosthetic appliance were also placed in this group.
5. **Impacted Teeth**
   This group comprised unerupted teeth which were either fully or partially impacted into hard or soft tissue in the presence or absence of symptoms.

   Diagnostic reproducibility was checked by a second examiner, who examined twenty randomly selected patients, as recommended by WHO (1977). These results correlated 100 per cent with the findings of the authors.

Data were recorded on computer coding forms and were transferred to punch cards for analysis in an IMB 370/148 computer using SPSS (Nie *et al* 1975).

RESULTS

A total of 1 041 teeth were extracted from 600 patients; 322 patients were examined at the Oral and Dental Teaching Hospital of the Witwatersrand, Johannesburg. This venue, provided the greatest proportion of the sample. The age distribution (Table 2) is similar to that reported by Lundqvist (1967), 18,8 per cent falling into the 30-39 year age group. In contrast, Trott and Cross (1966) and Johansen and Johansen (1977) reported that most of their patients were in the 20-25 age group. In the present investigation 48,8 per cent of patients were female (293) and 51,2 per cent were male (307); these were similar to those reported by Allen (1944).

The various reasons for extraction were analysed and these are presented in Table 3.

Dental caries was the reason for tooth loss in 67,8 per cent (407) of patients. Table 4 shows that 93,8 per cent (15) of patients in the 6-14 year age group had teeth extracted as a result of caries. The prevalence decreased progressively to 33,3 per cent in the 65 years and over age group, with the exception of the 55-64 year age group where a slightly higher than expected percentage of extractions was found.

Table 2:
FREQUENCY DISTRIBUTION OF PATIENTS BY AGE (n = NUMBER OF PATIENTS)

AGE GROUP IN YEARS	n	PERCENTAGE OF TOTAL SAMPLE
6 - 14	16	2,7
15 - 19	59	8,8
20 - 24	80	14,8
25 - 29	92	15,3
30 - 34	89	14,8
35 - 44	113	18,8
45 - 54	104	17,3
55 - 64	29	4,8
65 +	18	2,6

Table 3:
FREQUENCY DISTRIBUTION OF REASONS FOR EXTRACTION

	NUMBER	PERCENTAGE PREVALENCE OF TOOTH EXTRACTION
Caries, periapical pathology, and combination thereof.	407	67,8
Periodontal disease	114	19,0
Prosthetic reasons	14	2,3
Impactions	17	2,8
Trauma	32	5,3
Other	16	2,8
TOTAL	600	

Table 4:
FREQUENCY DISTRIBUTION OF THE CARIES GROUP OF PATIENTS BY AGE (n = NUMBER OF PATIENTS)

AGE IN YEARS	n	PERCENTAGE TEETH EXTRACTED PER AGE GROUP
6 - 14	15	93,8
15 - 19	52	88,1
20 - 24	76	85,1
25 - 29	71	77,2
30 - 34	67	75,3
35 - 44	60	53,1
45 - 54	48	46,2
55 - 64	15	51,7
65 +	3	33,3
	407	

Table 5:
FREQUENCY DISTRIBUTION OF PATIENTS UNDERGOING EXTRACTION DUE TO PERIODONTAL DISEASE BY AGE (n = NUMBER OF PATIENTS)

AGE IN YEARS	n	PERCENTAGE TEETH EXTRACTED PER AGE GROUP
6 - 14	0	0
15 - 19	0	0
20 - 24	3	3,4
25 - 29	5	5,4
30 - 34	12	13,5
35 - 44	32	28,3
45 - 54	47	45,2
55 - 64	11	37,9
65 +	4	44,4
	114	

Extraction due to periodontal disease was the reason for tooth loss in 19 per cent (114) patients and was first observed in the 20-24 year group. The prevalence gradually increased with age until the 55-64 year age group when the percentage decreased to rise again in the group of oldest patients (Table 5).

The prevalence of tooth extraction due to trauma varied according to age group as well as season of the year, and accounted for 5,3 per cent (32) extractions. The age group with the highest frequency of patients undergoing extractions due to trauma was the 35-44 year age group while the lowest frequency was in the 65 years and over age group (Table 6). The spring and summer months of September, October, November and December had the highest percentage of patients having extractions as a result of trauma, 33,2 per cent (22), while at the autumn and winter months of April, May, June, July and August 16,0 per cent (10) had the lowest.

Table 6:
FREQUENCY DISTRIBUTION OF PATIENTS UNDERGOING TOOTH EXTRACTIONS DUE TO TRAUMA BY AGE (n = NUMBER OF PATIENTS)

AGE IN YEARS	n	PERCENTAGE TEETH EXTRACTED PER AGE GROUP
6 - 14	1	6,3
15 - 19	3	5,1
20 - 24	5	5,6
25 - 29	4	4,3
30 - 34	5	5,6
35 - 44	10	8,8
45 - 54	3	2,9
55 - 64	1	3,4
65 +	0	0
	32	

Table 7:
FREQUENCY DISTRIBUTION OF PATIENTS REQUIRING EXTRACTION TO FACILITATE DENTURE CONSTRUCTION BY AGE (n = NUMBER OF PATIENTS)

AGE IN YEARS	n	PERCENTAGE TEETH EXTRACTED PER AGE GROUP
6 - 14	0	0
15 - 19	0	0
20 - 24	0	0
25 - 29	2	2,2
30 - 34	1	1,1
35 - 44	3	2,7
45 - 54	4	3,8
55 - 64	2	6,9
65 +	2	22,2
	14	

Table 8:
FREQUENCY DISTRIBUTION OF PATIENTS REQUIRING TOOTH EXTRACTION DUE TO IMPACTION OF TEETH (n = NUMBER OF PATIENTS)

AGE IN YEARS	n	PERCENTAGE TEETH REMOVED DUE TO IMPACTION PER AGE GROUP
6 - 14	0	0
15 - 19	2	3,4
20 - 24	5	5,6
25 - 29	7	7,6
30 - 34	2	2,2
35 - 44	1	0,9
45 - 54	0	0
55 - 64	0	0
65 +	0	0
	17	

Relatively few patients were referred for extraction in order to facilitate the construction of a dental prosthesis, namely only 2,3 per cent (14) patients. No patients requiring extraction for prosthetic reasons were found in the 6-14, 15-19 and 20-24 year age group. The 65 year and over group had the highest frequency (Table 7).

Impacted teeth were removed over a limited age group range in this study and accounted for 2,8 per cent (17) of all teeth removed. Patients requiring tooth removal as a result of impactions (Table 8) were first seen in the 15-19 year age group, 3,4 per cent (2), a prevalence which gradually increased to 5,6 per cent (5) in the 25-29 year age group. Thereafter the frequency dropped to 2,2 per cent (2) in the 30-34 year age group and 0.9 per cent in the 35-44 year age group.

DISCUSSION

The prevalence of 67,8 per cent (407) patients who lost teeth due to caries is similar to that found in the study of Trott and Cross (1966) in Manitoba, Canada.

Lundqvist (1967) obtained a figure of 63,3 per cent in Sweden, while Barclay (1974), reported a prevalence of 53,3 per cent in New Zealand. Trott and Cross (1966) also noted a similar gradual decrease in the percentage of patients losing teeth due to caries as age increased. As the latter workers included caries and periodontal disease combined under the heading of caries, their figure of 71,8 per cent does not allow for accurate comparison with the present study.

Following the gradual decrease in prevalence of caries with age, the small increase in the 55-64 year age group probably indicates an increase in cemental caries after gingival recession. In the present investigation no allowance has been made for the fact that many of the teeth extracted could possibly have been retained had restorative or endodontic treatment been carried out.

In the present study the total of 19 per cent (114) patients, who had teeth extracted as a result of periodontal disease alone is significantly higher in other studies, namely Trott and Cross (1966) — 11,8 per cent, Lundqvist (1967) — 9,8 per cent and Johansen (1970) — 9,1 per cent. In our opinion the high percentage recorded in the present study probably indicates that the patients were not aware of the importance of periodontal care in the prevention of tooth loss.

The total percentage of teeth lost due to trauma, 5,3 per cent (32) in this study, is significantly higher than those noted in studies by Johansen (1970) — 0,2 per cent, Barclay (1974) — 1,1 per cent and Johansen and Johansen (1977) — 0,1 per cent. The majority of patients requiring extractions due to trauma followed assaults. This could be explained by the high rate of violence in the residential area from where the patients were drawn. The higher frequencies of loss because of trauma in the summer compared to the winter months could correspond to the fluctuating levels of violence related to the various seasons. Similar trends related to facial fractures have been reported in the same population group (Beaumont *et al,* 1985). The 2,3 per cent (14) total

number of patients in this frequency found in Allen's study (1944), but is lower than that of Lundqvist (1967).

Of the 17 patients (2,3 per cent) requiring removal of impacted wisdom teeth, is lower than those in the studies by Allen (1944) — 13,0 per cent and Barclay (1944) — 11,1 per cent. This lower figure, in our opinion, is due to the fact that most patients have impacted wisdom teeth removed under general anaesthetic. This view is shared by other oral surgeons in the Johannesburg areas, but has yet to be substantiated.

CONCLUSION

As had been expected, based on clinical impressions, caries was the most common reason for tooth extraction in all age groups except for the 65 years and over group, in which periodontal disease was most common. Periodontal disease was next most common reason for tooth loss followed by trauma. Although the methods of recording tooth loss are only a crude index of the dental health of the community, the aims of this study, namely to assess the reasons for tooth loss in a blacks population group and to define a baseline for future studies, was achieved. The latter is of importance because while the study was under way, two Black language television channels had just been established. Exposure to commercial advertising and educational programmes by this powerful medium, had not been of sufficient duration to affect the dental health and knowledge of population groups to any extent.

Preventive dentistry programmes have been presented at Tladi clinic and Orlando clinic for 5 and 7 years respectively. School children in ever-increasing numbers are thus exposed to regular dental examination, the application of topical fluoride, fissure sealant application and oral hygiene instruction. This could significantly alter trends of tooth extraction in the future.

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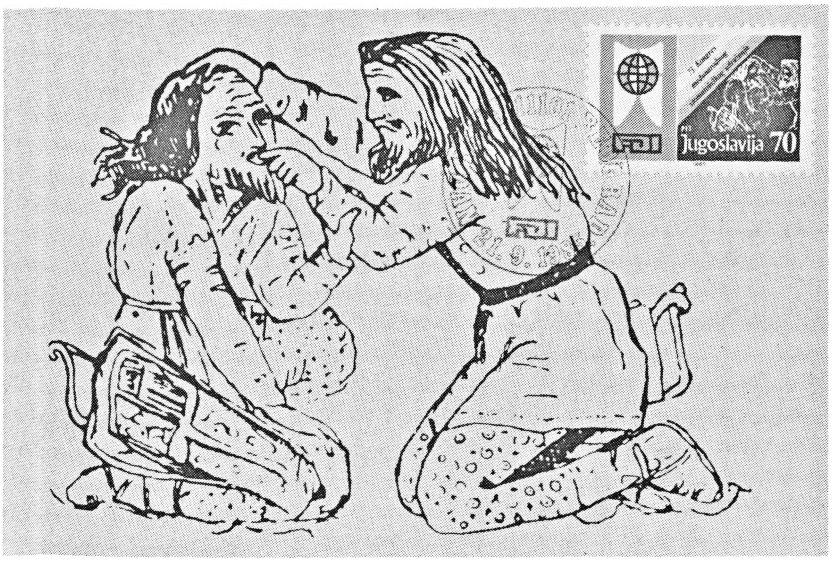
Commemorative stamp



On the occasion of the 73rd Annual Dental Congress in Belgrade the Yugoslav postal authorities issued a special stamp of 70 dinars.

The design of the stamp is the work of Dimitrije Cudov, an academic painter from Belgrade.

The stamps were printed in the Belgrade mint in multicolour offset, in sheets of 25.

The stamp was released on the 21st September. The same day, the working organization for the production and turnover of stamps, "Jugomarka" put into circulation a first day cover and a postcard (reproduced here).