

**THE EFFECT OF THE 2020 COVID-19 PANDEMIC LOCKDOWN
ON HAND INJURY PATIENT NUMBERS AND PROFILES AT
CHARLOTTE MAXEKE JOHANNESBURG ACADEMIC HOSPITAL:
A RETROSPECTIVE STUDY FROM 2019 TO 2021.**



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A research study submitted to the Faculty of Health Sciences,
University of the Witwatersrand, in partial fulfilment of the requirements for
the degree of Master of Medicine in Plastic and Reconstructive Surgery.

Johannesburg, 18 July 2025

DECLARATION

I, Vusani Sinoamadi, declare that this research report is my own, unaided work.

The submission of this research project is to the Faculty of Health Sciences for the degree of Master of Medicine in Plastic and Reconstructive Surgery, at the University of the Witwatersrand, Johannesburg South Africa. This work has not been submitted before for any other degree or examination at this or any other university.



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18 July 2025
Signed at: Johannesburg

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*“... and all the while, a great wind carries me across the sky”
-Ojibwe proverb.*

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DEDICATION

To my mother, Tendani.

ABSTRACT

The COVID-19 outbreak, first identified in December 2019 in China, was declared a pandemic by the WHO on March 11th, 2020. On March 23rd, a nationwide lockdown was announced in an attempt to reduce infection rates. This involved, but was not limited to, restrictions on people's movement and prohibition on the sale of intoxicants.

Hand injuries account for one-third of all traumatic injuries managed at hospitals. Resulting in severe morbidity, loss of employment, significant cost to the State, and subsequent detrimental effects on the economy.

The purpose of this study is to determine the effect of the COVID-19 Pandemic March – May lockdown period in 2020 on hand injury cases presenting to CMJAH (a central academic hospital in Johannesburg) by comparing the two months during the 2020 lockdown and the same time in 2019 and 2021.

This is a retrospective epidemiological study at CMJAH of hand injury numbers and patient profiles during the study period. Data was collected from adult patients presenting to CMJAH for hand injuries during the inclusion period between March 27th to May 31st, 2020 compared to data from the same period in 2019 and 2021. Data collection was from patient files, ED ledger, theatre records, treatment, and hospital stay. Demographics

included sex, age, dominant and injured hand, type of injury, mechanism of injury, and management.

A total of 541 patients with hand injuries were included in the study. A reduction in hand trauma admissions and consultations due to lockdown restrictions was found. 44.55% presented in 2019, 24.4% in 2020 and 31.05% in 2021. Among the patients in the study, 77.08% of cases were male. Most of the patients were right-hand dominant and were injured to the right hand. In this study injuries were more frequent between the ages of 25 and 35, the average age of patients was 33 years. The most common mechanism of injury encountered in all three time intervals did not change. They were penetrating injury, blunt injury, and infection. Most patients sustained injuries were classified as minor in severity.

This study described the epidemiology of hand injuries based on the patients presenting to the ED at CMJAH during the lockdown. It elucidated the changes in the profile of cases, reflected in the significant decrease in attendance.

The level of evidence was level IV.

Keywords: COVID-19; SARS-CoV-2; Lockdown; Hand injury; Hand surgery.

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Chapter 1 INTRODUCTION

1.1 COVID-19

The novel COVID-19 is a severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) that was identified in early December 2019 from Wuhan in China (1). The World Health Organization (WHO) declared the COVID-19 outbreak as a global emergency of international concern on the 30th of January 2020. On the 11th of March 2020, the Director General of the WHO reclassified the COVID-19 (SARS-CoV-2) outbreak as a pandemic (2). The first reported case of a COVID-19 positive individual in South Africa was announced on the 5th of March 2020 by the Minister of Health.

On the 15th of March 2020 the Head of State of South Africa declared a national state of disaster in response to the global COVID-19 pandemic. On the 23rd of March 2020 the South African presidential address announced a nationwide lockdown in attempts to curtail infection rates, while concurrently giving the healthcare sector time to prepare protocols and systems and redistribute resources to manage an unprecedented outbreak of global proportions. The lockdown involved restrictions on movement and gatherings of persons, the halting of manufacturing of goods, a moratorium on services not deemed

essential, closure of borders of the Republic, closure of education centres and the prohibition of public transport.

The lockdown started at midnight on the 26th of March to 30 April 2020 in efforts to ‘flatten the curve’. This was an attempt to limit the spread of the Coronavirus by reducing the person-to-person transmission rate, while the Department of Health could redirect limited resources and prepare for the deluge of COVID-19 patients in the context of an understaffed and overworked healthcare structure. This corresponded with COVID-19 alert level 5, the highest alert level, which indicated a high COVID-19 spread rate with a low health system readiness level. National restrictions included a total ban on the sale of alcohol and cigarettes, a work-from-home decree with exception of essential service employees, a curfew, and forced closure of universities, schools and nurseries, sports clubs, restaurants and take away outlets.

With time, the President announced a gradual easing of restrictions in a phased manner, under the COVID-19 Risk Adjusted Strategy. Starting from the 1st of May 2020, the national alert was lowered to level 4. Alert level 4 corresponded with a moderate to high COVID-19 risk of spread and a moderate health system readiness. On the 1st of June, the alert level was lowered to level 3. Alert level 3 indicated a moderate COVID-19 rate of spread with a moderate-to-high health system readiness level. At this time some limitations were relaxed further, however the mandated wearing of masks and implementation of social distancing remained.

1.2 Hand injury

Hands are the most frequently injured body part (3), accounting for up to 29% of all musculoskeletal injuries managed in hospitals worldwide. Additionally, injuries of the hand are approximately a fifth of all emergencies presenting to trauma units of hospitals (4). This makes hand injuries a major cause of morbidity in both developed and developing countries (5). In South Africa, the burden of hand injuries is largely due to road traffic accidents, infections, interpersonal violence and occupational causes (5). Similar to South Africa, in the emerging economy of Nigeria, a study by Ihekire *et al.* found that trauma and hand injuries are on the rise (5).

Trybus *et al.* established that approximately 10% of patients with hand injuries never return to their original occupations due to the morbidity of variable but persistent disability (3). Trybus *et al.* found that 26.7% of hand injuries occurred subsequently to alcohol intoxication. Furthermore, the aforementioned author added that the average cost of alcohol related hand injuries was more than double the cost of treatment in patients of sober habits (6).

The unemployment rate in South Africa, during the Covid-19 period, was at 30.8% (7). Stewart *et al.* found that the patients in their study on acute traumatic occupational hand injuries in South Africa, were the sole income earners in the household with multiple dependents. As a consequence of such injuries, any time off work that was not compensated, and any permanent disability could be devastating to the financial wellbeing of the patient and any dependents (8).

This is of some significance when one considers the vital role that fully functional hands play in daily life, and the importance of gainful employment in a country considered to be an 'emerging market'. For the majority of South Africans, the use of one's hands is directly and intimately linked to provision for oneself and one's family. Hand injuries present potentially devastating morbidity, loss of earning potential, and the inability to execute basic activities of daily living (3).

The majority of South Africans are classified as of low socio-economic status. The effect of this is a significant economic burden-of-cost to manage hand injuries falling to the State. This cost is compounded by a lengthy clinical management period. This includes consultations, hospital admission for in-patient care, surgeries, medication and hand therapy. Further cost takes the form of rehabilitation, ambulatory follow-up care in outpatient clinics, state pensions and compensation in the instance of temporary or permanent disability.

The costs extend beyond the state to commercial industry and the individual patient. The former is made evident in reduced productivity, days off work and accident compensation for work related injuries and insurance claims. The latter is in the form of loss of earning potential and a reduction in activities of self-care and daily living. Trybus *et al.* found that the average duration of management for hand injuries was 76.9 days (3).

Literature indicates that hand injuries occur most commonly among young males (3). Most hand injuries occur in the dominant hand (9). The majority of identifiable causes of hand injuries can be categorized into a triple burden, namely: 1) sepsis (especially associated with immune deficiency – for example HIV, malnutrition, diabetes), 2) trauma (work related injury, interpersonal violence and accidents) and 3) injuries attributable to substance intoxication, of which alcohol is the most common.

Comparable to the South African setting, Marston *et al.* found that the majority hand injury patients were young manual labourers. Many citizens and foreign nationals working in South Africa are employed in the informal labour market. This places labourers at increased risk of traumatic hand injuries in the workplace (10). Stewart *et al.* found that 40% of labourers with occupational-related hand injuries were not provided with any form of protective equipment or occupation-specific training to perform tasks safely (8).

Trybus *et al.* found that the most severe multi-tissue hand injuries were caused by the operation of machinery (3). Traumatic occupational hand injuries are detrimental to the economic work force, as the most available human resource is largely young male manual workers. Occupational causes of hand injuries result in significant time-off work and may even necessitate a forced change in occupation or permanent disability, often with less remuneration. In the South African setting, the most common causes of occupational hand injuries are related to the handling of machines or power tools, chief of which is the angle grinder (8). Such machinery result in high-energy injuries causing multi-tissue damage

including a mangled hand, traumatic amputations, open fractures, crush injuries, lacerations, tendon and nerve injuries.

Marston *et al.* showed that 31% of severe traumatic hand injuries were alcohol-related and therefore preventable (10). Furthermore, regarding the ethanol intoxicated patient, Trybus *et al.* published corroborative findings showing that 26.7% of hand injuries occur after alcohol consumption (3). Plüddemann *et al.* found that drugs and alcohol intoxication contributed to 73.4% of non-fatal general injuries presenting in South Africa (11).

Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) provides tertiary and in some cases, quaternary services. It is one of ten public-sector central hospitals in South Africa. It is the main teaching-hospital linked to the University of the Witwatersrand, providing academic and experiential training for many healthcare professionals. CMJAH serves a cluster catchment population of over five million people across three districts, namely West Rand, Ekurhuleni and Johannesburg Metro.

At CMJAH, hand injury cases are initially seen and triaged at the Trauma Department of the Emergency Services, which is the first point of contact for these injuries during a national disaster. At CMJAH hand injuries are managed by the Plastic and Reconstructive Surgery Department. The Hand Unit in this facility is one of two specialist Hand Units in Johannesburg. Of note, the Plastic and Reconstructive Surgery Department at CMJAH offers microsurgical services which are of particular use in certain hand surgery procedures such as free-flap surgery for hand cover, digital nerve or vessel repair,

revascularization and replantation surgery using standard microsurgical dissection and repair techniques. Each hand case is managed according to its unique presentation and injury with individualized procedure selection, using up-to-date literature-based solutions to provide straightforward, expedient, consistent and reproductive results.

Regarding the admission criteria of the Hand Unit: a myriad of hand injuries are managed by the department. Specifically, severe multi-tissue injuries, bony injury distal to the carpus at the wrist joint, vascular and tendon injuries distal to the elbow joint, and neurological injuries of the upper limb. Hand injuries may be stratified into the following general categories: Fractures and dislocations, infections, soft-tissue injuries, amputations, and burns. The general management strategy for hand injuries involves immediate reconstruction of all tissue structures involved. Multi-tissue and major hand injuries may require staged reconstructive procedures.

Hospitalization for specialist treatment is usually indicated for severe or multi-tissue injuries. This is often followed by surgical management and rehabilitation in the outpatient hand clinic once discharged. Patients who did not require admission may be treated on an out-patient basis at the Plastic Surgery / Hands Clinic, the exception to the aforementioned is if patients leave against medical advice, signing refusal of hospital treatment or by abscondment.

A hand injury is defined as any injury to the upper limb, closed or open, distal to the wrist that substantially involve skin, muscle, tendon, bone, nerve and or vessels (12). An upper

limb injury is defined as an injury to the forearm, elbow, arm and shoulder. Injuries are considered open if they are associated with a breach of the overlying skin.

The importance of hand function in earning a living cannot be overemphasized and will be considered in this study. International studies conducted in response to the global pandemic have shown a significant reduction in hand trauma admissions, and consultations due to lockdown restrictions (13). It was postulated that hand injuries presented to CMJAH Emergency Department (ED) declined during the time when COVID-19 Level 4 and 5 occurred. This may be attributed to a combination of alcohol restrictions (bar services and bottle store closure), limitation of personal movement (with curfews and strict prohibition of recreational travel), and a prohibition of all gatherings in public venues (entertainment centres, eat-in restaurants, social and fitness clubs), including sports activities and music festivals.

Hand injury severity grading is an important consideration because hand injuries have potentially dire consequences to the patient and the State, such as a protracted recovery time, permanent disability and immoderate management costs. This study used a severity stratification system published by the author Zhu *et al.* (14) classifying severity of injury into four levels. Level I is defined as a condition without any injuries to bone, tendon, nerve or artery (minor). Superficial infections, cellulitis and paronychia are also included here. Level II is defined as a single injury to bone, tendon, nerve or artery (moderate). Hand sepsis is also included in this level. Level III is defined as poly-trauma to bones, tendons, nerves and / or arteries (severe). Level IV is defined as injuries requiring replantation, amputation or flap covering (major). The mangled hand is included in this

level.

1.3 Rationale and benefit of this study

Literature was reviewed and to the authors' knowledge, no previous study with a similar title, aim, objectives, or study population was found in the South African setting. The rationale of this study was the elucidation of the demography, injury characteristics and profile of hand injury cases during a national crisis (the COVID-19 pandemic). This information is invaluable for the healthcare sector, in order to prepare for a possible future crisis that may pose a threat to humanity. Any comparable crisis would have significant consequences for the health, economy, safety and freedom from restrictions of the citizens of South Africa.

1.4 Aim and objectives

1.4.1 The aim of the study was:

Determining the effect of the COVID-19 Pandemic March - May lockdown period in 2020 on hand injury cases presenting to CMJAH by comparing this period to the same time interval (March – May) in 2019 and 2021.

1.4.2 The objectives of the study were:

- 1) To determine the effect of COVID-19 Pandemic lockdown on patient numbers seen at the ED of CMJAH, and to compare them with the prior year and subsequent year.

- 2) To compare the effect of the 2020 COVID-19 lockdown on the profile of hand injury cases (epidemiology of hand injuries during the lockdown) to the same time-period in the preceding year of 2019 and the subsequent year of 2021.
- 3) To ascertain if the hand injury profile seen during the lockdown has any influence on the severity of injuries.

Chapter 2 PATIENTS AND METHODOLOGY

2.1 Study design, site and population

This is a hospital based single centre, retrospective study undertaken at the CMJAH Hands Unit (a division of the Plastic and Reconstructive Surgery), a tertiary care facility in Johannesburg, Gauteng, South Africa.

This retrospective observational study is of data from all adult hand cases (namely upper limb – distal to the elbow joint, including all brachial plexus injuries) presenting to CMJAH ED, serving the city of Johannesburg and surroundings, between 27 March 2020 and 31 May 2020. The data was collected by the principal investigator (myself: Vusani Sinoamadi). The data was compared to data from the same period in the preceding year (2019) and the following year (2021). The collected data were from the records of patients who consulted the CMJAH ED, as recorded in the ED ledger, admissions book in the Plastic Surgery / Hands Wards, the theatre ledger and patient files. Patient characteristics that were of interest to the study were copied, namely: details of the injuries (type of injury and MOI demography of the patient, treatment and disposition.

A specially designed data collection sheet was used to capture data for analysis such as demographics, details of the injury, handedness, treatment (operative *versus* nonoperative) and duration of hospital stay. Mechanism of injury was subdivided into five categories on the data sheet, namely: penetrating injury, blunt injury, burns, infections

and 'other'. The latter category would encompass any mechanisms not covered by the aforementioned categories, such as brachial plexus traction injury and high-pressure injection injury.

2.2 Statistical analysis

The variables of the study were gathered using an EXCEL® software (Microsoft Corporation, Redmond, WA, USA) spreadsheet and exported to STATA version 18.0® software (StataCorp LP, College Station, TX, USA) for the purposes of statistical analysis.

Descriptive statistics were used to describe the central tendency of measurement (such as mean) of all normally distributed variables from the dataset. Interquartile range (IQR) were used to describe asymmetrical variables.

Categorical variables were summarized using frequencies and percentages while continuous variables were summarized using mean. Percentages, data tables and diagrammatic representation of study findings are available in the Results Section.

The lockdown time-points were reported using a pie chart while the number of days admitted, and time duration of the operation were reported using bar charts. The Chisquare test was used to compare age, gender, side of injury, severity, surgery and outcome. Similarly, the comparison of severity with the number of days admitted, and duration time of the operation was also achieved by using the Chi-square test.

Logistic regression (forward conditional) was used to test the relationship between variables and COVID-19 time periods to test the relationship between variables.

Significance was set at 5%, meaning that a p-value of less than 0.05 was used to reject the null hypothesis and was considered statistically significant.

2.3 Inclusion and exclusion criteria

Only adult patients (18 years of age or older) who presented to CMJAH Emergency Department (ED) with hand injuries were included in the study to constitute the research population. Data were collected from ED records and patient files regarding patient demographics, such as: age, gender (male / female), injury characteristics (mechanism and type of injury), and total number of casualty consultations, admissions and surgeries.

The inclusion period for the exposed group corresponds with a combination spanning COVID-19 alert levels 5 and 4 in South Africa (27th March to 31st May 2020) as published in the Government Gazette by the Department of Health. The inclusion period for the control group corresponds with the same period in 2019 (a full year preceding the lockdown), and the corresponding period in 2021 (a full year succeeding the lockdown).

No patients who presented with chronic hand injuries or lesions were included. Fractures proximal to the carpus and vascular injuries proximal to the elbow were excluded as they are managed by for example the Orthopaedic Surgery and the Vascular Surgery.

Departments at CMJAH.

2.3.1 Ethics

Ethics approval [Clearance number: M240658] was received from the WITS Human Research Ethics Committee (HREC) (medical). A letter of approval on behalf of the Chief Executive Officer of the CMJAH was also obtained. The study is registered online on the Gauteng Health Research Committee page with proposal number (GP_202408_030) on The National Health Research Database. Since the study was retrospective and data collection was from the patient register of the Trauma Casualty Department (Area 163) at CMJAH, and patient files, no patient consent was needed.

All patient identifiers were kept safely on a separate list only available to the principal investigator and supervisors. The data collected were assigned study numbers (1, 2, 3 etc.) without any personal identifiers such as name, hospital numbers, ID numbers etcetera recorded on the data sheet, to maintain the anonymity of the patients.

Chapter 3 RESULTS

3.1 Demographic characteristics

The median (IQR) age of the 541 patients who presented to the ED at CMJAH was 33 years (range: 26 to 42 years). Figure 3.1 shows the age distribution of the patients.

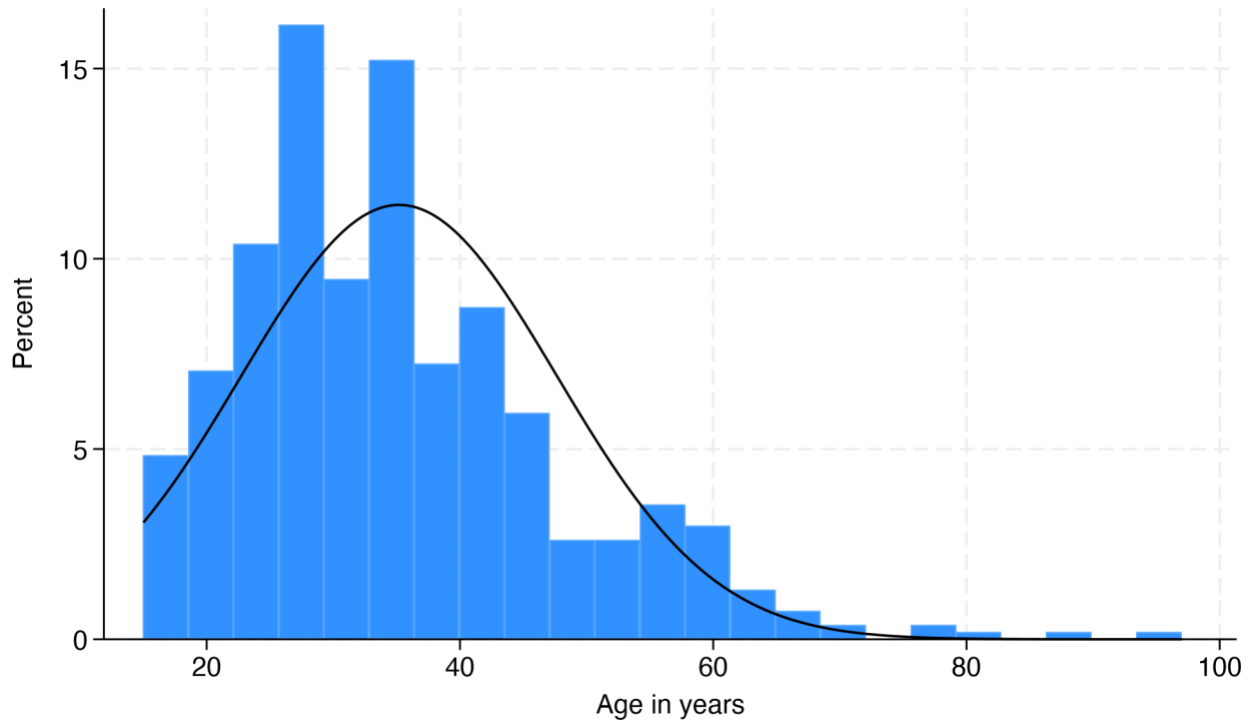


Figure 3.1 Age distribution of the participants

Table 3.1 summarizes the demographic distribution of patients. The majority of patients were in the age group 25-34 years ($n=204$, 37.71%). The majority of patients were of the black race ($n=500$, 92.42%).

Table 3.1: Demographic characteristics

Variables	Categories	Frequencies (n)	Percentages (%)
Age groups in years	<=24	98	18.11
	25-34	204	37.71
	35-44	133	24.58
	>=45	104	19.22
	Not specified	2	0.37
Gender	Female	124	22.92
	Male	417	77.08
Race	Black	500	92.42
	Coloured	10	1.85
	Indian	5	0.92
	White	26	4.81

The proportion of patients seen over the study period was divergent, as shown in Figure 3. 2. Most patients were seen before the lockdown (2019) = 241 (44.55%), while 168 (31.05%) patients were seen post lockdown (2021), and the least number of patients, 132 (24.4%) presented with acute hand injuries to CMJAH within the lockdown period (2020).

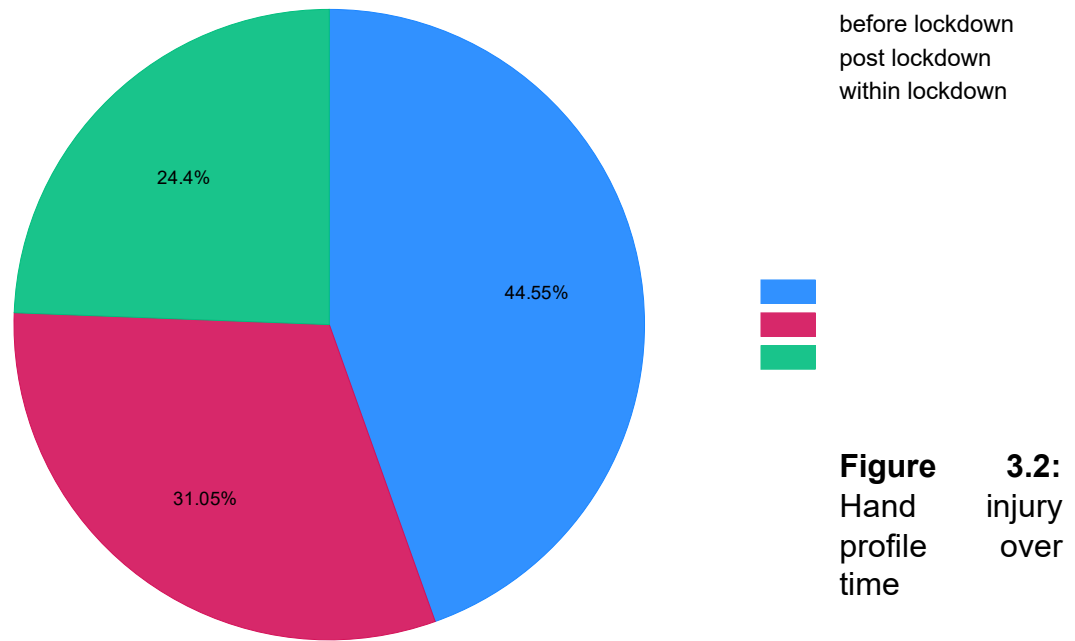


Table 3.2 shows the hand injury characteristics and outcomes. Hand dominance was recorded in all cases. The majority of patients were right-handed (90.57%, n=490), which corresponds to the majority of right-hand injuries (56.19%, n=304). 42.7% (n=231) of patients presented with left-hand injuries. Only 1.11% had injuries to both right and left hands (n=6).

Most patients sustained a minor injury (severity level 2) (44.55%, n=229). This is in keeping with the findings of a Swedish study by Rosberg *et al.* [15]. 48.8% of the patients were admitted to CMJAH for further management (n=264) and 44.73% of the total number were subsequently discharged (n=242). Regarding management type, namely operative *versus* non-operative, 51.94% underwent surgical intervention (n=281).

Surgical management entailed operative procedures specific to the type of hand injury. In addition to this, patients were generally washout/cleaned, debrided and dressings and

splints applied where applicable. Following reparative surgery, various techniques are available in the armamentarium of the plastic and reconstructive surgeon for wound closure of the hand. The approach utilized by the Hand Unit to manage wounds in the department is the “reconstructive ladder” approach, with the rungs of the ladder starting from “the simple” (e.g., healing by secondary intention, primary closure, skin grafts) increasing in intricacy to “the complex” (e.g., free tissue transfer).

Table 3.2: Characteristics of hand injuries and clinical outcomes

Variables	Categories	Frequencies	Percentages
		(n)	(%)

Handedness	Not specified	2	0.37
	Left	49	9.06
	Right	490	90.57
Severity of injury	1. Not specified	1	0.19
	2. (Minor) Condition without injuries on bone, tendon, nerve or artery/Superficial infections	229	44.55
	3. (Moderate) Single injury on bone, tendon, nerve or artery/ Hand sepsis	215	41.83
	4. (Severe) Poly-trauma on bones, tendons, nerves or arteries.	25	4,86
	5. (Major) Injuries requiring replantation, amputation or flap covering / mangled hand	44	8.56
Surgery	Not specified	13	2.4
	Not operated	247	45.66
	Operated	281	51.94
Outcome	Not specified	1	0.18
	Admitted	264	48.8
	RHT (Refusal of hospital treatment)	29	5.36
	Transferred	5	0.92
	Discharged	242	44.73

Figure 3.3 shows the breakdown of the hand injury types observed among the patients stratified by hand structures damaged or affected. The most frequently injured structure was soft tissue, accounting for 31.61% of cases, with lacerations being the main cause. This was followed by metacarpal and phalangeal bone fractures (18.11%) and thirdly, by

tendinous injury (13.86%). Hand sepsis accounted for 10.72% of cases in the study. These ranged from cellulitis, paronychia, felons, tenosynovitis, deep space infections and osteomyelitis. Traumatic amputations accounted for 5.36% of the study injuries. An appreciable 9.61% of cases were documented as unclassified due to missing information in the patient and theatre records.

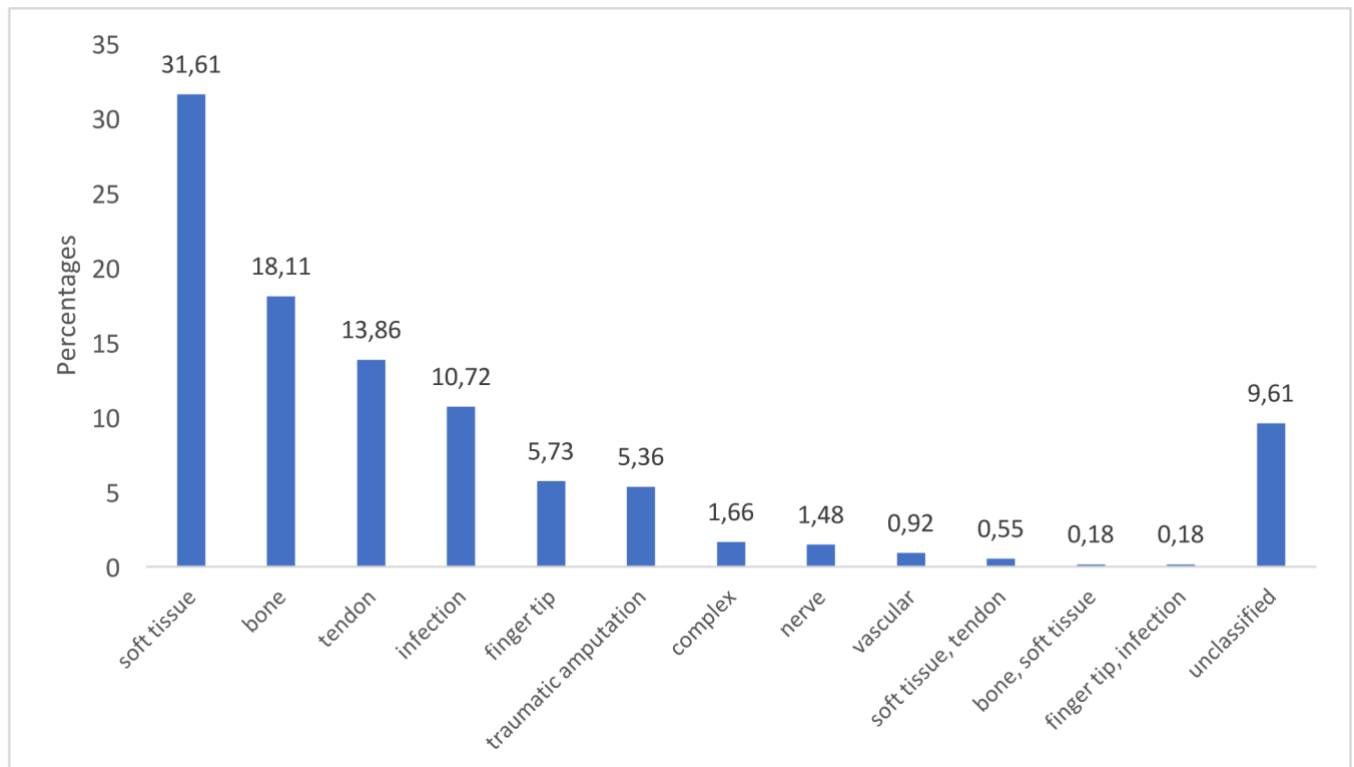


Figure 3.3: Stratification of hand injury by type

The data was stratified into a trichotomy of time intervals as follows: March – May 2019, March – May 2020 and March – May 2021 which corresponded with the months of alert levels 4 and 5 of the lockdown period. Across all three time points, most of the patients seen with hand injuries were aged 25-34 years. There was no significant statistical difference in the age groups of patients seen during these respective time points. When

sex-based subgroups were analyzed, the majority of patients were males in all three time points. There were no significant statistical differences of gender predominance found before, during and post COVID-19. The majority of the patients (n= 417, 77.08%) were male in all three the time periods.

The majority of patients had injuries to the right upper limb, and this was also found across all three time periods of the study without any significant statistical difference noted. Very few patients (1.11%, n=6) sustained injuries to both right and left hands simultaneously, this concurs with the literature [5,16]. Of importance, all the bilateral hand injuries reported in the study were exclusively in the event of burn injuries.

Regarding severity, most injuries in this study were minor and moderate. The post lockdown period (March – May 2021) had the most hand injuries, and importantly, with greater severity (23.03% with score 3/4), compared with the other two time periods (March – May 2019 and 2020), which both had less than 10% of patients with severe (3/4 score) hand injuries. This finding was statistically significant ($p<0.001$). Regarding the need for surgical intervention, most hand injuries were not surgically operated during the lockdown period. The 2019 (pre-COVID-19) operated case numbers were fewer than the 2021 (post-COVID-19) operated cases and these differences were statistically significant, ($p<0.0001$). During the post-COVID-19 period, most patients were either admitted or transferred to stepdown facilities (71.43%) compared with pre-COVID-19 (40%) and within (40%) COVID-19 periods.

Table 3.3: Epidemiological comparison of hand injuries between three time periods
(March to May 2019, 2020 and 2021)

Variable	2019 Before lockdown n (%)	2020 Within lockdown n (%)	2021 Post lockdown n (%)	p-value
Age groups				
<=24	45(18.75)	24(18.18)	29(17.37)	0.113
25-34	89(37.08)	47(35.61)	68(40.72)	
35-44	70(29.17)	26(19.7)	37(22.16)	
>=45	36(15)	35(26.52)	33(19.76)	
Gender				
Female	50(20.75)	36(27.27)	38(22.62)	0.356
Male	191(79.25)	96(72.73)	130(77.38)	
Handedness				
Left	24(10.04)	11(8.33)	14(8.33)	0.791
Right	215(89.96)	121(91.67)	154(91.67)	
Severity				
1 Minor	104(47.06)	66(51.97)	59(35.76)	<0.001
2 Moderate	97(43.89)	50(39.37)	68(41.21)	
3 Severe and 4 Very Severe	20(9.05)	11(8.66)	38(23.03)	

Surgery				
No	116(49.79)	77(58.78)	54(32.93)	<0.001
Yes	117(50.21)	54(41.22)	110(67.07)	
Outcome				
Admitted / Transferred	96(40)	53(40.15)	120(71.43)	<0.001
RHT/Discharged	144(60)	79(59.85)	48(28.57)	

Further details on the distribution of injuries by severity were as follows: Before lockdown (2019) minor injuries were the most prevalent (47.06%), followed by moderated injuries (48.89%) and severe / very severe injuries accounting for the lowest proportion (9.05 %). During lockdown (2020): minor injuries were the most common (51.97%), followed by moderate injuries (39.37%) and the severe / very severe injuries accounted for 8.66%. Post lockdown (2021): moderate injuries were the most prevalent (41.21%) followed by minor injuries (35.76%), while severe / very severe injuries accounted for 23.03%.

Regarding duration of hospital stay, Figure 3.4 shows the number of days the patients were admitted as in-patients for the three time points of the study. The mean durations of stay were as follows: Before COVID-19 (2019) most patients were admitted for 4 days (24.39%), within the COVID-19 time-period (2020) most patients were admitted for 3 days (31.25%), while most patients (32.76) were admitted for 2 days in the post COVID-19 (2021) period.

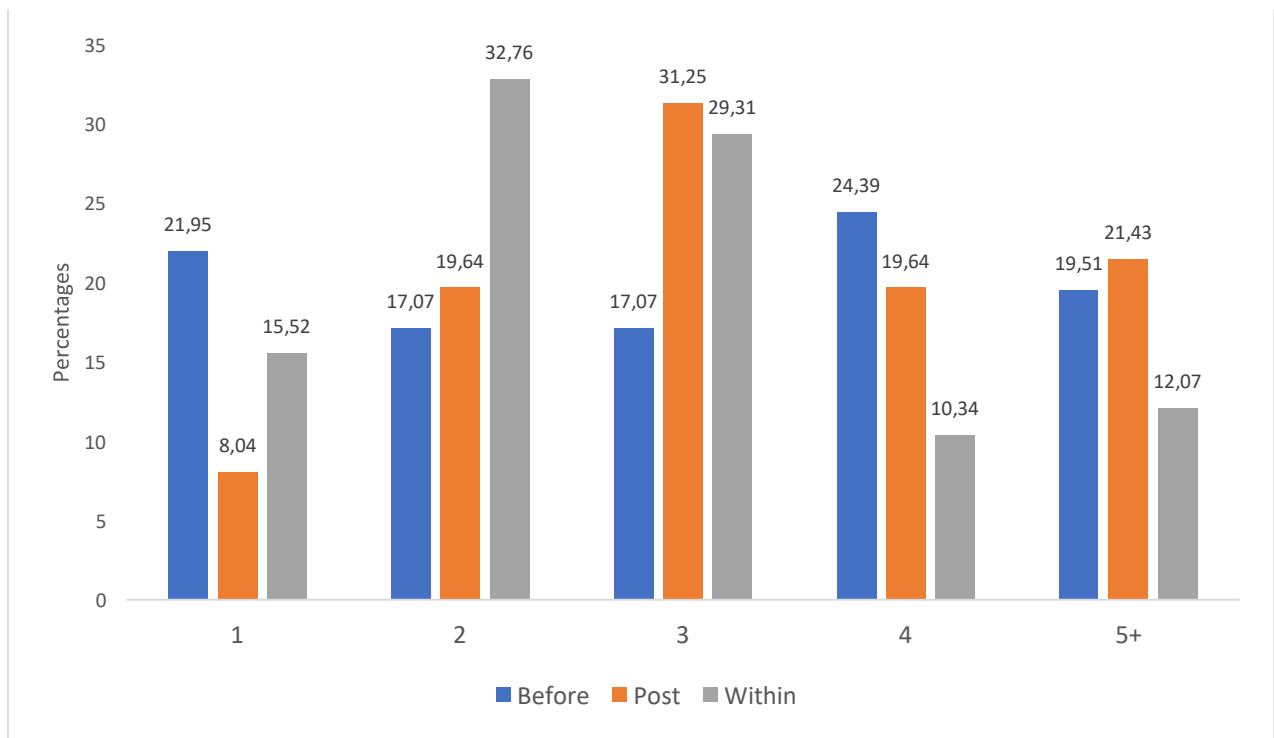


Figure 3.4: Number of days in hospital

Figure 3.5 shows the number of hours of surgery on patients who were operated on over the three time periods. Across all three time periods, most of the hand surgeries took 1-2 hours to complete (mean duration of operations). This was in keeping with the findings of a study from Turkey by Davas Aksan *et al.* [17] where the mean duration of operations was 2 hours. In the current study, 53.85% of operations were 1 to 2 hours in duration before COVID-19, 44.44% within COVID-19 and 41.35% post-COVID-19.

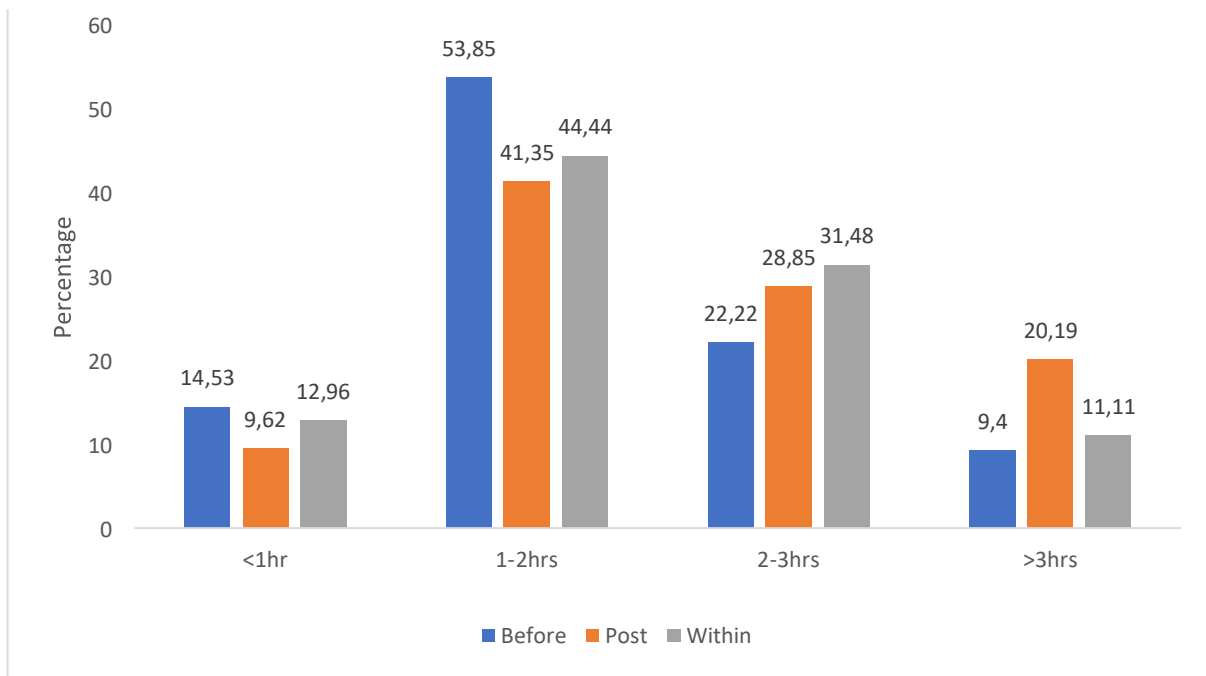


Figure 3.5: Duration of surgery in hours.

Throughout the three time-intervals in this study, the leading mechanisms of injury (MOI's) in descending order of frequency by percentages were: penetrating injuries, blunt injuries and infections. In the pre-lockdown and post lockdown periods, burns were the fourth single most common MOI accounting for 2.9% and 3.59% respectively. This is in keeping with the findings of Roseberg *et al.* who reported a burn rate in hand injuries of 3% [15]. Curiously, during the lockdown period this was not the case, with burns accounting for 0.76% of MOI responsible for hand cases presenting to CMJAH.

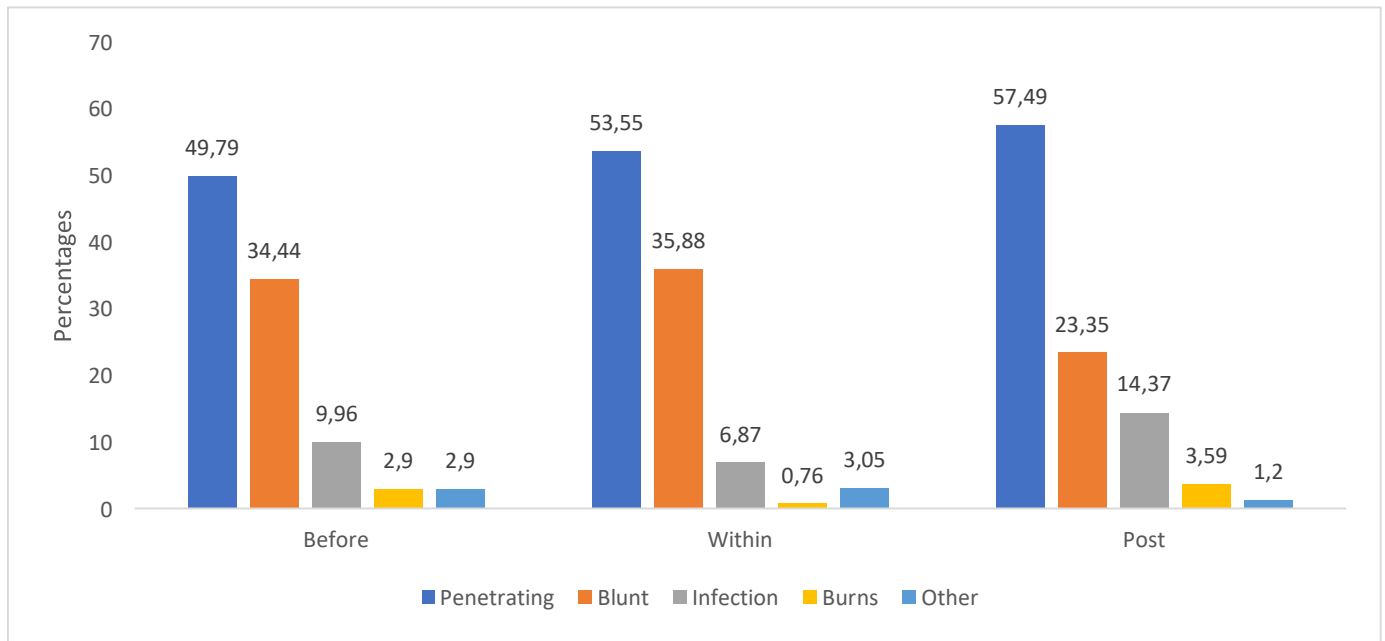


Figure 3.6: Mechanism of injury (MOI)

Table 3.4 shows results for the relationship between severity of the patient's injury and the number of days admitted and time of surgery. Patients with severity 3/4 would require at least 2 days of admission while other severity levels would be admitted for one day and this was statistically significant, ($p < 0.001$). The 'severity 1' / minor severity injuries were admitted for significantly less time than the more severe injuries and this was statistically significant, ($p < 0.001$).

Table 3.4: Association between severity, surgery time and hospital stay

	Severity 1 n (%)	Severity 2 n (%)	Severity 3/4 n (%)	p-value
Number of admission days				
1	20(27.78)	20(12.35)	5(8.47)	<0.001
2	22(30.56)	23(14.2)	17(28.81)	
3	14(19.44)	42(25.93)	17(28.81)	
4	10(13.89)	43(26.54)	5(8.47)	
5+	6(8.33)	34(20.99)	15(25.42)	
Duration of operation				
<1hr				<0.0001
1-2hrs	25(49.02)	7(4.29)	2(3.28)	
2-3hrs	23(45.1)	80(49.08)	27(44.26)	
>3hrs	2(3.92)	52(31.9)	19(31.15)	
	1(1.96)	24(14.72)	13(21.31)	

The majority of patients in the study were young, (25 to 35 years of age) at the time of presentation. The mean age of patients in the study was 33 years. The age findings of the study were similar to another a study from Kenya on the African continent, with a mean age of 28 years [18]. Trybus *et al.* found an average age of 37 years in their study [3], which is understandable as their study was done in an environment with a mostly post-productive population.

A high proportion (77.08%), nearly four out of five of all patients in this study were male.

The male-to-female ratio was 3.4:1. This is consistent with the findings regarding male patients among hand injuries reported in global literature, with a 76% male predominance in the United States and 69% in the United Kingdom [19].

Chapter 4 DISCUSSION

It was Louis Sullivan who coined the maxim “form follows function” and it is aptly illustrated in the analysis of the hand. The architectural complexity of the hand reflects its intricate functional proficiency. The human hand is a multiplex and dynamic appendage that is vital for the adaptive skills of gainful employment for almost all South Africans. The adequately functioning hand allows people to meet their personal, social and economic responsibilities. Furthermore, the hand plays an integral role in communication, self-expression and activities of daily living. Examples of the latter include feeding, personal hygiene, dressing, toileting, food preparation and housekeeping.

At the time of this study, 4 076 463 cases of Coronavirus had been diagnosed, and furthermore 102 595 associated fatalities were recorded in South Africa [24]. Beyond these figures, COVID-19 has had indelible consequences on the healthcare sector in South Africa and the world at large. This retrospective, cross-sectional study characterized the epidemiological profile of patients who suffered hand injuries during the lockdown period, who were seen at CMJAH ED, to elucidate the relationship between the COVID-19 pandemic and the characteristics of acute hand injury. The graveness of studying hand injuries lies within the functional consequences and the financial implications of an injured hand, to the patient through productivity costs and to the State through healthcare costs. The economic impact of hand injuries is astronomical, resulting in hand injuries totalling nearly a third of trauma related visits to the ED. More than lower limb fractures, brain injuries, skull fractures and knee injuries in cost terms [20].

The COVID-19 pandemic outbreak and subsequent lockdown had worldwide consequences that have shaped how people live and interact with one another, and how the healthcare sector reorganizes, adapts and manages a modern-day global crisis. The Department of Health, including specialized Hand Units, have not been exempt from these effects and the inevitability of change.

In this study, hand injuries and the severity of such, of three time periods of 12 weeks each, spanning over three years, were compared. The experimental period was (March, April and May 2020), which corresponds to the combination of alert levels 4 and 5 of the COVID-19 lockdown time.

The results of this study indicated that the March to May COVID-19 lockdown period of 2020 is linked to a number of changes in the demography of patients seen with hand injuries, compared with the corresponding months of 2019 and 2020. During lockdown the majority of hand injury patients were male (77%) of young of age (33 years on average). Furthermore, 91% were right hand dominant, and 56.19% injured the right hand. Knowledge of this handedness of injuries has implications on the limitations to activities of daily life while healing, the intensity and course of rehabilitation, leave from work and accident compensation from State grants and insurers.

During the lockdown most patients sustained minor and moderate injuries (in keeping with literature (21) and did not require operative intervention, but for those who underwent surgical management, the surgical duration was approximately 1 to 2 hours. Most of the

patients were not admitted into hospital, but those who were admitted, stayed for an average of three days for inpatient hospital treatment of three days. The implications of this information extends from analysis of current capacity to manage hand injuries during a national crisis to planning and preparedness in the future. As most patients were not admitted, this implies that they were adequately managed at the ED level. This does not negate the seriousness of the injuries but rather speaks to the importance of a well-stocked and staffed ED to address hand injuries . For those cases requiring admission in future, resources needed will include bed allocation for more male patients with an anticipated turnover of 4 days, and availability of a dedicated hands theatre with an estimation of two hours per case for a majority of injuries.

During the lockdown period, as with the same time intervals of 2019 and 2021, the three most common MOIs seen were penetrating injury, blunt injury and infections. The injuries most commonly sustained were soft tissue lacerations, phalangeal fractures and tendon injuries. The ramifications of these mechanisms cannot be underestimated and often interconnect. Penetrating injuries having the potential to disrupt multiple structures simultaneously that warrant surgical repair individually. Blunt injuries may conceal underlying trauma that need investigation and management. Infections have devastating potential for multi-tissue damage, and rapid spread can be life and limb threatening. Knowledge of the frequency of occurrence of these MOIs in the setting of a national crisis is invaluable. Burns were less frequently seen during the lockdown period compared with the same period a year before and after the COVID-19 lockdown.

Amidst the height of the national lockdown, all non-essential workers were mandated to stay home, social distancing guidelines were enforced, there was closure of recreational and fitness clubs, debarment of religious and social gatherings, curfew was implemented, police presence increased, and the sale of all intoxicants were forbidden. These restrictive measures had effects on the aim and objectives of this research study. During the lockdown period there was a diminution in the number of hand injury patients presenting to CMJAH. A causative relationship can be postulated between the findings of this study and the government mandated lockdown restrictions, specifically the curtailment on movement of citizens and prohibition of alcohol. Speculatively, the avoidance of presentation to hospitals during the COVID-19 pandemic in fear of contracting and spreading the virus, could be considered a *priori* contributing factor, as part of risk aversion adaptive strategies.

The current study provides insights into the epidemiological profile of hand injuries during the confinement of a national lockdown. The findings hereof would allow government and national policy makers a launchpad to structure a preventative education campaign. This would lend efficacy to lessen the burden on the healthcare system in the management of hand injuries during a similar crisis. Resultantly, this would prove vital during a time when the Hands Unit at CMJAH would be stretched to capacity with a shortage of doctors, nurses, technicians and therapists.

The epidemiological shift seen through reduced numbers of hand injuries presenting to CMJAH during the COVID-19 lockdown, may be explained by the policies mentioned

earlier being enforced by government during this period. This reduction in hand injury patient numbers may pose a strategic advantage in future, as the reduced patient load allows an already strained healthcare sector (with shortages of practitioners, theatre availability and materials) to strategize, redistribute resources and plan adequately in the event of a future pandemic or cataclysmic event [22].

Postulations may be made about the epidemiological trends, namely the reduction in hand injury admission numbers during the COVID-19 lockdown. A supposition is that the level 4 to 5 lockdown restrictions enforced by the government contributed to the decline of hand injuries seen at this time. The distribution and profile of hand injuries during the lockdown period reflects the mandated changes in movement, intoxicating vices, gatherings and proximity to others. Restriction of the sale of intoxicants such as alcohol resulted in fewer motor vehicle accidents, trauma cases, interpersonal violence and sports injuries in general.

COVID-19 tested the resilience, organizational capability and versatility of national healthcare systems. The findings of this study may play a role in the amelioration of health and safety practices and legislation thereof, in areas of prevention and management. This would serve to reduce the burden of hand injuries in the event of a future national lockdown. These study results might contribute to minimizing the economic impact of hand injuries during a pandemic for both the individual patient and the state at large. These results could all be valuable in efforts to redistribute limited resources, as guided

by predicted patient demographics of studies such as this current one, to provide management to as many patients as possible during a global catastrophe.

Additional investigations are needed in the form of a larger prospective, multi-centre studies using the Modified Hand Injury Severity Score (MHISS) to assess the severity of hand injuries presenting to CMJAH, under various circumstances to accurately ascertain the outcomes of hand injuries during restrictions such as a national lockdown. The use of the MHISS was not possible in this current retrospective study due to the unavailability of informational detail required.

The MHISS is a hand injury scoring system based on the Hand Injury Severity Scoring System (HISS), the most commonly used scoring system for hand injuries developed by Campbell and Kay in 1996 [25]. The HISS is a descriptive severity scoring system for hand injuries distal to the carpus designed with an aim to devise a score that would grade hand injuries by severity as a guide to the most likely outcomes. The modification is the inclusion of injuries proximal to the carpus. Hand and forearm injuries are classified in terms of their Integument (skin and nail), Skeletal (bone and ligament), Motor (tendon) and Neurovascular (nerve and vascular) (ISMN) components.

Each ISMN component contains both absolute scores and scores which are weighted according to the functional importance of the affected ray. To illustrate, thumb injuries (which account for approximately 40% of total hand function [26]) are given a greater weighting than 5th digit injuries. Component scores are doubled when factors such as

compound fractures, crush injuries or wound contamination are present. When dealing with amputation, all missing structures are scored. Each ISMN component is tallied to give the total MHISS score, which is grouped into four categories of increasing severity, namely: minor (<20), moderate (21 – 50), severe (51 - 100) and major (>101).

It is hypothesized that hand injuries during a national lockdown can be lowered further through education and safety training to the patients served by CMJAH, and disaster preparedness of the specialized Hand Unit and the Department of Health as part of a larger campaign concerning preventative strategies.

This study has therefore identified a number of crucial areas that could be aimed at in the event of future lockdowns in terms of prevention and resource distribution.

4.1 Tabulation of Recommendations

Further Research

This study serves as a launching platform for further research to aid the South African healthcare system to prepare for hand injuries during possible future pandemics of similar proportions and restrictions.

This study recommends that similar studies on hand surgery should be undertaken at other healthcare centres, in the context of national lockdown or global pandemic crises, in order to reduce the burden on the healthcare system of South Africa and thus reduce the resultant grave economic implications. This could form part of effective pandemic decision-making and resource management, to address hand injuries during a national lockdown in the context of a global crisis in future.

Populous Education

A future education campaign on social media platforms could focus on awareness strategies and messages to combat factors linked to traumatic hand injuries during a national lockdown. People who are at risk during a lockdown are those engaged in leisure activities, do-it-yourself (DIY) projects, kitchen chores and garden work. Further risk is found in performing an unusual task, using household tools or machinery for tasks other than what designed or recommended for, being distracted or rushing or working with machinery while feeling ill, lack of the proper maintenance of power tools, and not using personal protective equipment such as gloves which are cut-resistant.

Standardized Guidelines

The development of guidelines by organizations such as specialist hand units and societies of hand surgery in South Africa, could mitigate the risk of hand injuries during a national lockdown. Such guidelines will give insight and recommendations to the healthcare sector to arrange and distribute resources for the anticipated hand injury patients, that are likely to present to an already overwhelmed ED during a national crisis.

Protective Gloves

Sorock *et al.*, found that glove use was associated with a lower risk of laceration and puncture injuries more than crush, avulsion, amputation, fracture, or dislocation. The authors found that glove use was associated with a lower risk of hand injury across all categories of occupations (27). Glove use should be strongly advocated while working with machinery at home, especially during times of lockdown.

National Preventative Campaigns

The gravitas of hand injuries is reflected in the functional and economic ramifications thereof. Trybus *et al.* found that 58.5% of hand injuries had functional impairment of variable severity in the injured hand despite adequate rehabilitation by a qualified hand therapist [3]. This underlines the importance of national campaigns for preventing hand injuries that would need to be enforced in innovative ways to target members of the population who are at risk, particularly during lockdowns where people are confined to their homes [23].

The reprieve that would result from an effective preventative campaign could offer relief to the healthcare system during a crisis, allowing the specialist Hand Unit of CMJAH to

provide the necessary treatment, such as: surgery, inpatient management, specialist hand therapy and follow-up care in a timely fashion. Such a campaign could improve treatment results and outcomes and curtail the morbidity and costs of hand injury for the individual patients and the State.

WALANT Technique

A related avenue of further study could be the use of the Wide Awake Local Anaesthesia No Tourniquet (WALANT) method (28) and regional anaesthetic blocks by the hand surgeon in the ED without admission, in instances where theatre availability is severely diminished, such as a national lockdown for a pandemic. Another is the use of telemedicine in the context of initial consultation of minor hand injuries and for patient follow up during a national lockdown where in-person review risks infection spread to healthcare workers, other patients, families and communities.

4.2 Limitations of the current study

By virtue of being a retrospective study by design, the study relied on data collected from patient records. A retrospective study has a significant drawback, since in reality, clinical records at the medical records Department of the CMJAH are often incomplete. The omission of variables and data have the disadvantage that the impact and outcomes of the research study could be diminished and/or biased especially in small studies such as the current study.

Furthermore, there is also a chance of some patients not presenting for consultation of hand injuries during the lockdown, in fear of contracting COVID-19 at the hospital, or transmitting it to other patients or essential healthcare providers. This could contribute to an underrepresentation of the effects of the lockdown on hand injuries during the national lockdown. Subsequently, this could lead to a knock-on effect of severe hand infections, a

myriad of missed cases and delayed presentations after lockdown from injuries that went unmanaged during lockdown. Furthermore, this could result in delayed rehabilitation and worsened morbidity.

At CMJAH, patient records are at present a filing of paper-based data that is later transcribed to microfilm, technology of a bygone era that requires a microfilm reader to project the records on site. This results in the potential for records to be lost or misplaced, and as a consequence, a paucity of records for the purposes of data retrieval for sensible research studies. Many patient files are missing, some do not have complete notes and/or reliable patient contact information. Advocacy for an electronic records system may be of merit to surmount this challenge in future.

Chapter 5 CONCLUSIONS

This current research study describes the epidemiology of hand injuries during the COVID-19 (SARS-CoV-2) national lockdown of March to May 2020 compared with the corresponding time periods the year before and the year after the lockdown. A total of 541 patients were included. The 2020 lockdown resulted in a reduction in hand trauma consultations and admissions compared corresponding time interval in 2019 and 2021. 77.08% of the patients were male. Most of the patients were right-hand dominant and were injured to the right hand. Most patients sustained injuries that were minor in severity. The average age of patients was 33 years. The commonest MOIs in all three time intervals were consistently : penetrating injury, blunt injury, and infections.

This study gives insight into the hand injury patient during the national lockdown and serves to increase awareness that may be instrumental for hand injury prevention and management during future lockdown periods. Young males who are right-handed are at risk and should be educated about the risks of soft-tissue, tendon and bony injuries to their dominant hand during a national lockdown. Such patients are the most at risk for presenting to the CMJAH Hands Unit, possibly needing admission and surgical intervention during the time when healthcare resources and theatre availability are scarce.

Novel methods of population education and increased hand injury prevention awareness are needed to curtail the overwhelming burden on the healthcare system during a possible future pandemic. Further studies may be beneficial in planning preventative campaigns, targeting the populations most at risk of hand injuries, and to safeguard the health and

wellbeing of South Africans in general, especially during an anticipated pandemic in the future.

REFERENCES

- 1) Huang C., Wang Y., Li X., Ren L., Zhao J., Hu Y. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020; 395(10223):497-506. doi: 10.1016/S0140-6736(20)30183-5
- 2) World Health Organization: Coronavirus disease (Covid-19) pandemic, Geneva 2020; <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
Accessed on 28/06/2024
- 3) Trybus M., Lorkowski J., Brongel L., Hl'adki W. Causes and consequences of hand injuries. *Am J Surg*. 2006; 192(1):52-7. doi:10.1016/j.amjsurg.2005.10.055
- 4) Dias JJ., Garcia-Elias M., Hand injury costs. *Injury*. 2006; 37(11):1071-7. doi: 10.1016/j.injury.2006.07.023
- 5) Ihekire O., Salawu S., Opadele T., Causes of hand injuries in a developing country. *Can J Surg*. 2009; 53(3):161-66.
<https://www.canjsurg.ca/content/cjs/53/3/161.full.pdf>. Accessed on 12/07/2024

- 6) Trybus M., Tusiski M., Guzik P. Alcohol-related hand injuries. *Injury* .2005; 36(10):1237-1240. doi: 10.1016/j.injury.2004.09.003
- 7) Statistics South Africa. Statistics by theme/ People/Work and Labour Force.
http://www.statssa.gov.za/page_id=737&id=1 Accessed on 18/07/2024
- 8) Stewart A., Biddulph G., Firth GB. The aetiology of acute traumatic occupational hand injuries seen at a South African state hospital. *SA Orthop J* 2017; 16(4): 4953. doi:10.17159/2309-8309/2017/v16n4a8
- 9) Beaton AA., Williams L., Moseley LG. Handedness and hand injuries. *J Hand Surg Br* 1994; 19(2):158-61. doi: 10.1016/0266-7681(94)90154-6.
- 10) Marston RA., Alcohol-related hand injuries: an unnecessary social and economic cost. *Ann R Coll Surg Eng* 1992;74(5):312-3.
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2497677/?page=1> Accessed on 21/07/2024
- 11) Plüddemann A., Parry C., Donson H., Sukhai A. Alcohol use and trauma in Cape Town, Durban and Port Elizabeth, South Africa: 1999-2001. *Inj Control Saf Promot* 2004; 11: 265-7. doi: 10.1080/156609704/233/289599.
- 12) Fortané T., Bouyer M., Le Hanneur M., Epidemiology of hand traumas during the COVID-19 confinement period. *Injury* 2021; 52(4): 679 - 685. doi:

- 10.1016/j.injury.2021.02.024.
- 13)** Régas I., Bellemère P., Lamon B., Bouju Y., Lecoq F.A., Chaves C. Hand injuries treated at a hand emergency center during the COVID-19 lockdown. *Hand Surg Rehab.* 2020; 39(5): 459–461. doi: 10.1016/j.hansur.2020.07.001
- 14)** Zhu H., Zhu X., Zhang C., Zheng X. Risk Factors of Acute Hand Injuries in Manual Workers: A Case-control study. *Nature: Scientific Reports.* 2017; 7:12208. doi:10.1038/s41598-017-12385-5
- 15)** Rosberg HE, Dahlin LB. Epidemiology of hand injuries in the middle- sized city in Southern Sweden: a retrospective comparison of 1989 and 1997. *Scand J Plast Reconstr Surg Hand Surg* 2004; 38:347-55. doi: 10.1080/02844310410022117
- 16)** Dębski T., Noszczyk BH., Epidemiology of complex hand injuries treated in the Plastic Surgery Department of a tertiary referral hospital in Warsaw. *Eur J Trauma and Emer Surg* 2021; 47:1607–1612. doi.org/10.1007/s00068-020-01312-5
- 17)** Davas Aksan A., Durusoy R., Ada S., Kayalar M., Aksu F., Bal E. Epidemiology of injuries treated at a hand and microsurgery hospital. *Acta Orthop Traumatol Turc* 2010; 44(5):352-360. doi:10.3944/AOTT.2010.2372
- 18)** Kaisha WO., Khainga S. Causes and pattern of unilateral hand injuries. *East Afr Med J* 2008; 85:123-8. doi: 10.4314/eamj.v85i3.9634

- 19)** Sorock GS., Lombardi DA., Hauser R., Eisen EA., Herrick RF., Mittleman MA. A case-crossover study of transient risk factors for occupational acute hand injury. *Occup Environ Med* 2004; 61:305-11. doi: 10.1136/oem.2002.004028
- 20)** De Putter CE., Selles RW., Polinder S., Panneman MJM., Hovius SER., van Beeck EF. Economic impact of hand and wrist injuries: health-care costs and productivity costs in a population-based study. *J Bone Joint Surg Am* 2012; 94: e56–61. doi: 10.2106/JBJS.K.00561.
- 21)** Rosberg HE, Carlsson KS, Dahlin LB. Prospective study of patient with injuries to the hand and forearm: cost, function, and general health. *Scand J Plast Reconstr Surg Hand Surg* 2005; 39:360-9. doi: 10.1080/02844310500340046.
- 22)** Mareiniss DP. The impending storm: COVID-19, pandemics and our overwhelmed emergency departments. *Am J Emerg Med* 2020; 38:1293–4. doi: 10.1016/j.ajem.2020.03.033
- 23)** Bellemere P, Guimberteau JC. Experience of a national campaign for hand trauma prevention in France. *Handchir Mikrochir Plast Chir* 2013; 45:335–8. doi: 10.1055/s-0033-1355386
- 24)** Department of Health. SA Coronavirus [Internet]. <https://sacoronavirus.co.za>
Accessed on 18/08/2024

- 25)** Campbell DA, Kay SP. The Hand Injury Severity Scoring System. *J Hand Surg Br* 1996; 21B (3):295-8. doi: 10.1016/s0266-7681(05)80187-1
- 26)** Emerson ET, Krizek TJ, Greenwald DP. Anatomy, physiology, and functional restoration of the thumb. *Ann Plast Surg* 1996; 36(2): 180–91. doi: 10.1097/00000637-199602000-00014
- 27)** Sorock GS, Lombardi DA, Hauser R, Eisen EA, Herrick RF, M A Mittleman MA. A case-crossover study of transient risk factors for occupational acute hand injury. *Occup Environ Med* 2004; 61:305–311. doi: 10.1136/oem.2002.004028.
- 28)** Lalonde DH, Tang JB. How the Wide Awake Tourniquet-Free Approach Is Changing Hand Surgery in Most Countries of the World. *Hand Clin.* 2019; 35(1): xiii–xxiv. doi: 10.1016/j.hcl.2018.10.001.

APPENDICES Appendix A: Data collectionsheet

Study Identification No.	
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Age	
Gender	
Hand Dominance	
Race	
Diagnosis Type of injury Including anatomical area affected	
Mechanism of injury 1. Penetrating (incl.: GSW, Stabbing) 2. Blunt (incl.: FOOSH) 3. Burns (Thermal, Chemical, Electrical) 4. Infections (e.g.: Necrotizing fasciitis) 5. Other e.g.: A. BPTI - Brachial plexus traction injury B. High pressure injury (grease/ paint gun) C. Blast injury	
Casualty Consultation Date	
Admission 1. Date 2. Duration (No. of days)	
Surgery 1. Procedure Key: A. Soft tissue wounds B. Osteosynthesis, peripheral nerve repair, tendon repair C. Septic cases	
Severity Score • Minor • Moderate • Severe • Major	

Appendix B: Requisition for permission to conduct research



Vusani Sinoamadi
Department of Surgery

Faculty of Health Science

University of Witwatersrand

01 June 2024

TO: WHOM IT MAY CONCERN

Re: Requisition for permission to conduct a study by Dr. V Sinoamadi, (Student No 1858397)

Dear Sir/Madam,

I write to request permission to conduct a study at the University of the Witwatersrand for the purposes of the Master of Medicine Degree in Plastic & Reconstructive Surgery at the University of the Witwatersrand.

The title of the study is: "The effect of the 2020 COVID-19 Pandemic Lockdown on hand injury patient numbers and profiles at Charlotte Maxeke Johannesburg Academic Hospital: A Retrospective study from 2019 to 2021".

My supervisors are Dr. S.E. Phiri, DR. M. Nel and Prof. E. Ndobe.

I hope this meets your consideration,

Regards,

A handwritten signature in black ink, appearing to read 'V. Sinoamadi'.

Dr. Vusani

Sinoamadi
(076)4447780

sinoamadi.v@gmail.com

Appendix C: Ethics Clearance Certificate

R14/49 Dr Vusani Sinoamadi M240658

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M240658

NAME: Dr Vusani Sinoamadi
(Principal Investigator)

DEGREE: MMed Plastic and Reconstructive Surgery

STUDENT/STAFF NO: 1858397

FACULTY/SCHOOL: Faculty of Health Sciences, School of Clinical Medicine

DEPARTMENT: Plastic and Reconstructive Surgery

STUDY SITE (S): Charlotte Maxeke Johannesburg Academic Hospital

PROJECT TITLE: The effect of the 2020 COVID-19 pandemic lockdown on hand injury patient numbers and profiles at Charlotte Maxeke Johannesburg Academic Hospital: A retrospective study from 2019-2021

DATE CONSIDERED: 21/06/2024

DECISION: Approved unconditionally

CONDITIONS:

NOTE: Ethics Online System ref no MED24-05-501

SUPERVISOR: Dr Sibusiso Phiri, Dr Marietha Nel and Prof Elias Ndobe

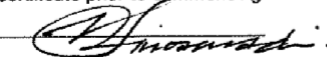
APPROVED BY: 
Prof P Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 01/10/2024 **EXPIRY DATE:** 01/10/2029

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

DECLARATION OF INVESTIGATORS

I/we fully understand the conditions under which I am/we are authorized 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 the application to Committee. I agree to submit a yearly progress report in July each year until study is closed. Failure to submit annual report will result in ethics clearance certificate suspension. 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 reviewed in June and will therefore be due in the month of June each year. Unreported changes to the application invalidate the clearance given by the HREC (Medical). Email signed copy of this ethics clearance certificate prior to commencing with the study hrec-medical.researchoffice@wits.ac.za


Principal Investigator Signature

02/10/2024
Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix D: Plagiarism Declaration

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I VUSANI SINOAMADI (Student number: 1858397) am a student
registered for the degree of MMed Plastic and Reconstructive
Surgery in the academic year 2024.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature:  Date: 10/05/2024

Appendix E: HOD/ Division of Plastic and Reconstructive
Surgery letter of approval

DEPARTMENT OF PLASTIC & RECONSTRUCTIVE
SURGERY

7 York Road, Parktown, 2193, Johannesburg, South Africa • Telephone (011) 488-3494 • thendo@email.com

TO: WHOM IT MAY CONCERN

Re: Permission to conduct a study by Dr. V Sinoamadi, Student No 1858397

Dear Sir/Madam,

Permission is hereby granted for the above mentioned doctor to conduct a study under the Division of Plastic & Reconstructive Surgery at the Charlotte Maxeke Johannesburg

Academic Hospital. The title of the study is 'The effect of the 2020 COVIDlockdown on hand injury patient numbers and profiles at Charlotte Maxeke Johannesburg -19 pandemic

Academic Hospital: A retrospective study'. This study is being conducted to fulfill part of the Master of Medicine Degree in Plastic & Reconstructive Surgery at the University of the Witwatersrand.

The candidate will adhere to all regulations relevant to the conduct of research studies as prescribed by the ethics committee.

Please feel free to contact us at any time for any clarity seeking queries.

Thank you for your time.

Kind Regards



Dr. Thendo Netshiongolwe

Head | Division of Plastic & Reconstructive Surgery
Charlotte Maxeke Johannesburg Academic Hospital
University of the Witwatersrand



Appendix F: CEO approval letter,

CMJAH



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

**CHARLOTTE MAXEKE JOHANNESBURG
ACADEMIC HOSPITAL**

Enquiries: Mr E Mosiamo
Email: edward.mosiamo@gauteng.gov.za
Tel: 011 488 4206
Ref: 1/7/2

To: Vusani Sinoamadi

NHRD Ref: GP_202408_030

FINAL APPROVAL OF STUDY

STUDY TITLE: "The effect of the 2020 COVID-19 Pandemic Lockdown on hand injury patient numbers and profiles at Charlotte Maxeke Johannesburg Academic Hospital: A Retrospective study from 2019 to 2021"

Permission to conduct the above-mentioned study at Charlotte Maxeke Johannesburg Academic Hospital (CMJAH) is granted subject to the following:

- Charlotte Maxeke Johannesburg Academic Hospital will not in any way incur or inherit costs as a result of the said study.
- Your study shall not disrupt services at the study sites.
- Strict confidentiality shall always be observed.
- Informed consent shall be solicited from participants in your study.

Before commencing data collection, please liaise with the relevant Head/s of Department and / or Unit to confirm arrangements, and agree on dates and times that suit all parties.

Once the research is completed, kindly forward the results to the CMJAH research committee Secretariat on cmjahresearch@gauteng.gov.za

Approved / Not Approved

Prof. Mary Kawonga

Chairperson: CMJAH Research Committee

Signed on behalf of the CEO, CMJAH

Date: Oct 3, 2024