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# Characteristics of Maxillofacial Trauma Cases Before and During the Pandemic: A Rapid Review

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**Abstract**

*Maxillofacial trauma refers to injuries affecting the facial region and its surrounding tissues, involving both hard and soft tissue structures. When accompanied by head trauma, such injuries can be life-threatening, highlighting the critical need for prompt medical intervention. The emergence of SARS-CoV-2 in December 2019 prompted the World Health Organization (WHO) to recommend widespread social restrictions, significantly altering various aspects of life, including the patterns of maxillofacial trauma. This study aims to provide an overview of the characteristics of maxillofacial trauma before and during the COVID-19 pandemic. This study employs a rapid review methodology following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Data were retrieved from Scopus, ScienceDirect, and PubMed databases using specific keywords: for the pre-pandemic period — (maxillofacial trauma* OR maxillofacial injuries) AND (incidence OR etiology OR type); and for the pandemic period — (maxillofacial trauma* OR maxillofacial injuries) AND (incidence OR etiology OR type) AND (COVID-19 OR COVID 19 OR coronavirus OR SARS-CoV-2). A total of 15 articles met the inclusion criteria and were analyzed qualitatively. Prior to the pandemic, 15 etiological factors were identified, with road traffic accidents, falls, and interpersonal violence being the most common. The most prevalent types of trauma were orbital, mandibular, and zygomaticomaxillary complex (ZMC) injuries. During the pandemic, a decrease in reported cases was observed, along with fewer recorded etiological factors. Mandibular trauma emerged as the most frequently reported type, followed by orbital and ZMC trauma.*

## Introduction

Maxillofacial trauma is an injury that occurs to the face and surrounding tissues, which includes both hard and soft tissues. The soft tissues of the face are the tissues that cover the hard tissues of the face. The facial hard tissues are the bony parts of the head consisting of the zygomatic arch, maxilla, mandible, eye socket bones, alveolus bones, nasal bones, and teeth (Shiffman & Di Giuseppe, 2013). Maxillofacial injuries, especially fractures, require special attention during diagnosis due to their anatomical proximity to the brain and are often associated with serious comorbid injuries such as traumatic brain injury (Abosadegh et al., 2019). Maxillofacial injuries are common in polytrauma patients, and the spectrum can be mild to life-threatening injuries. Primary assessment and management can be critical (Bonanthaya et al., 2021). The epidemiology of maxillofacial trauma can vary greatly from country to country (and even

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within the same country), and it depends on several factors, including culture, socioeconomic background, and population density (Boffano et al., 2014). The main causes of maxillofacial fractures are motor vehicle accidents and physical altercations. Other causes of injury include falls, sports-related incidents, and work-related accidents (Hupp et al., 2018). Road traffic accidents are the leading cause of maxillofacial injuries in some developing countries (Singaram et al., 2016).

In December 2019, a new strain of virus was discovered in Wuhan, China called SARS-COV-2 (WHO, 2020). The World Health Organization (WHO) declared COVID-19 a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 and further declared a pandemic situation on 11 March 2020 (Steffens, 2020). WHO recommends every country to implement social distancing policies, suspend large gatherings, including temporary closure of schools and offices to prevent an increase in the number of COVID-19 cases (Qian & Jiang, 2022; Salzano et al., 2021). These significant mobility restrictions certainly affect every aspect of life, such as habitual activities or lifestyles, and people's behavior. It is known that lifestyle and behavior affect the epidemiology of fracture or trauma, so changing human mobility can cause changes in maxillofacial trauma patterns that we can see from the incidence, etiology and type of trauma (Salzano et al., 2021).

The imposition of lockdown measures appears to have resulted in a significant decrease in several major causes of trauma, such as sports and recreational trauma or car accidents, along with a significant decrease in facial trauma surgery (de Boutray et al., 2021). Research by (Vishal et al., 2022) in India showed that during the strict lockdown period (March 24 - June 7, 2020) the number of patients with maxillofacial trauma was 36 patients, while during the same time period in 2019, it reached 158 patients. In the lockdown period, traffic accidents were the leading cause with 22 out of 36 cases (61.11%), followed by physical assault with 9 (25%) cases, and falls and other causes recorded 4 (11.11%) cases. In the 2019 period, the most common cause was traffic accidents with 135 out of 158 cases (85.44%), falls and other causes were recorded in 16 (10.12%) cases, and physical attacks in 6 (3.79%) cases.

A 2021 study (Philip et al., 2022) in Kerala, South India, showed that dentoalveolar fractures were the most common fractures in the pre-COVID-19 group (February 1, 2019 - January 31, 2020) and the COVID-19 group (February 1, 2020 - January 31, 2021). In the pre-COVID-19 group, dentoalveolar fractures were followed by fractures of the zygomaticmaxillary complex (25%), mandible (13.5%), maxilla (12.4%), frontal bone (11.4%), nasal bone (8%), condylar (7.7%), NOE (5.5%), zygomatic arch (2.8%), and fractures of the primary teeth (0.4%). Meanwhile, in the COVID-19 group, the most common fracture types after dentoalveolar were zygomatic-maxillary complex (31.7%), frontal bone (15.1%), nasal bone (12.3%), maxilla (12%), mandible (10.1%), NOE (8.6%), condylar (7%), zygomatic arch (3.1%), and primary tooth fracture (0.6%).

Based on the above, the author is interested in conducting research to determine the characteristics of maxillofacial trauma before and during the COVID-19 pandemic. This study was conducted with the aim of looking at the characteristics of maxillofacial trauma, which will be seen from the aspects of etiology, type, and incidence of trauma, before and during the COVID-19 pandemic, which is expected to be an information provider for health facility stakeholders to prepare better resources in case the pandemic occurs again.

## Methods

This study is a literature review in the form of a rapid review that aims to see a picture of the characteristics of maxillofacial trauma before and during the COVID-19 pandemic using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analytic) analysis, which is a reporting guide for identifying, selecting, assessing, and synthesizing studies, designed to help report transparently why the review was conducted, what the authors did, and

what they found (Page et al., 2021). The research questions were framed according to PICO (Population, Intervention, Comparison, Outcome) as follows; Population: maxillofacial trauma patients; Intervention: articles on maxillofacial trauma characteristics; Comparison: the period before the COVID-19 pandemic and during the COVID-19 pandemic; Outcome: a description of the characteristics of maxillofacial trauma in the period before and during the COVID-19 pandemic.

This study uses secondary data derived from previous studies. Article searches were conducted on three databases namely Scopus, ScienceDirect, and PubMed. The keywords used to search for articles before the pandemic were (maxillofacial trauma* OR maxillofacial injuries) AND (incidence OR etiology OR type), while the keywords to search for articles during the pandemic were (maxillofacial trauma* OR maxillofacial injuries) AND (incidence OR etiology OR type) AND (COVID-19 OR COVID 19 OR coronavirus OR SARS-CoV-2). Articles that have been obtained are then filtered using advanced search from each database, according to the inclusion and exclusion criteria. The inclusion criteria were articles in English or Indonesian, articles published from July 2017 - February 2020 (to look at maxillofacial fracture patterns before the pandemic) and March 1, 2020 - October 31, 2022 (to look at maxillofacial fracture patterns during the pandemic), retrospective study, cohort, or cross-sectional research designs, populations with maxillofacial trauma, and countries with social restrictions, self-quarantine, or lockdown (for articles in the period during the pandemic). The exclusion criteria set in this study were duplication of literature and articles in the form of literature studies or reviews.

Titles and abstracts of articles that match the research theme will be selected. The next step is to read the article in its entirety to ensure the content is in accordance with the research theme. Articles that have met the inclusion criteria will then be processed for data extraction. The search strategy for articles to be reviewed is shown in Figure 2.1

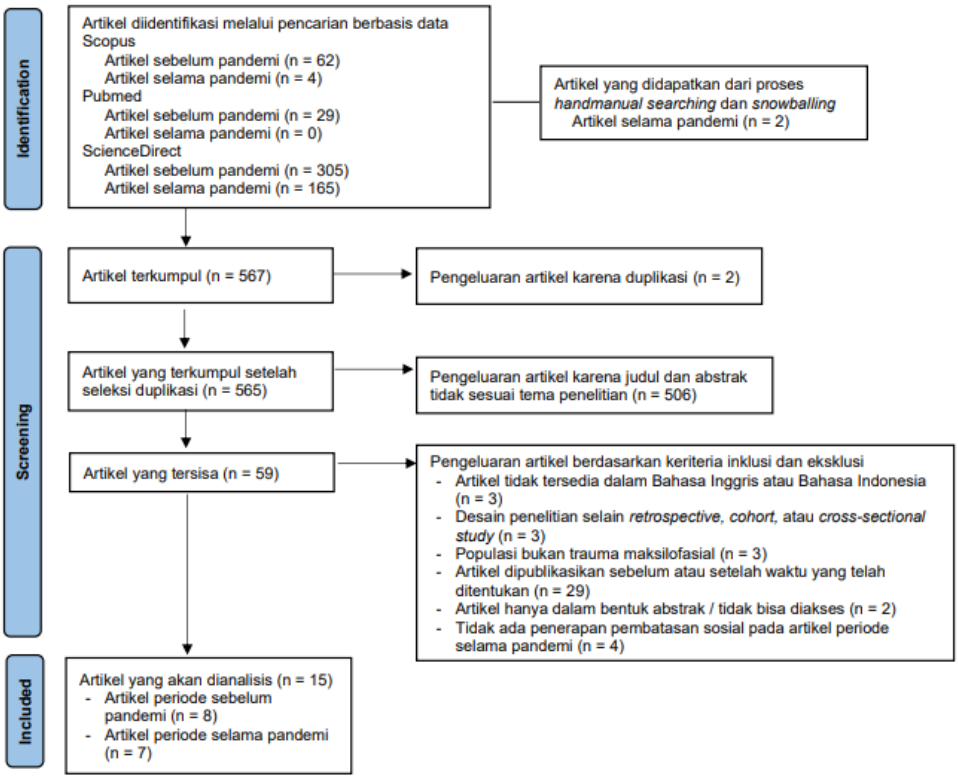


*Figure 1. PRISMA Flow Diagram of Article Search Results*

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## Result and Discussion

Titles and abstracts of articles that match the research theme will be selected. The next step is to read the article in its entirety to ensure the content is in accordance with the research theme. Articles that have met the inclusion criteria will then be processed for data extraction. The search strategy for articles to be reviewed is shown in Figure 2.1.

In the seven literatures that presented data on maxillofacial trauma during the COVID-19 pandemic, a total of 12 contributing factors to maxillofacial trauma were identified, with falls, traffic accidents, interpersonal violence, and sports injuries being the most frequently mentioned causes in 7 literatures each. The most dominant type of maxillofacial trauma was trauma to the ZMC, orbital, and mandible which were each mentioned in 5 literatures, followed by trauma to the nasal and frontal sinuses which were each recorded in 4 literatures. Table 1 in the appendix presents data from each literature consisting of literature identity (author, year of location, study design, and title), period category, sample size and characteristics, type of trauma, cause of trauma, and incidence of maxillofacial trauma. Furthermore, table 2 presents the etiological grouping of maxillofacial trauma in the period before and during the pandemic, and table 3 presents the distribution of research results regarding the etiology of maxillofacial trauma before and during the COVID-19 pandemic.

Table 1. Types, Causes, and Incidence of Maxillofacial Trauma Before and During the COVID-19 Pandemic

| Author | Year | Study Design | Title | Sample Size and Characteristics | Types of Maxillofacial Trauma | | Causes of Maxillofacial Trauma | Incidence of Maxillofacial Trauma |
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| | | | | | Hard/soft tissue trauma | Trauma Type | | |
| AlHammad Z, Nusair Y, Alotaibi S, Ababtain R, Alsulami S, Aljumah G | 2020 | Cross-Sectional | A cross-sectional study of the prevalence and severity of maxillofacial fractures resulting from motor vehicle accidents in Riyadh, Saudi Arabia | A total of 372 subjects with 325 males (89%) and 47 females (9%) | Hard and Soft Tissue Trauma | Midface fractures (Orbital, Zygomatic bone, Zygomatic arch, Nasal bone, Le Fort II, Le Fort I, Maxillary Dentoalveolar, Le Fort III), Mandibular fractures (Subcondylar, Body, Angle, Mandibular Dentoalveolar, Symphysis, Parasymphysis, Condyle, Ramus, Coronoid), and soft tissue trauma | Motor vehicle accident (n=295; 80%), fall (n=40; 11%), sports (n=16; 4%), violence (n=12; 3%), and other (n=9; 2%) | Of the 372 maxillofacial fracture patients, 295 patients (80%) were due to motor vehicle accidents, with the most vulnerable age range of 20 - 24 years, the most common fracture site was the midface (64%) especially the orbit (32%) and zygomatic bone fractures (20%). Fractures of the mandible were 17% with the most fractured parts being the subcondylar (19%), body (18%) and angle (18%). |
| Assiri ZA, Salma RG, Almajid EA, Alfadhel AK | 2020 | Retrospective | Retrospective radiological evaluation to study the prevalence and pattern of maxillofacial fractures among military personnel at Prince Sultan Military Medical City [PSMMC], Riyadh: An institutional study | Of the 263 patients, 207 (78.7%) were male and 56 (21.3%) were female. The age range was 3 - 67 years with a mean age of 26.21 years. | Hard Tissue Trauma | Mandibular fractures (symphysis, parasymphysis, body, angle, ramus, condyle, coronoid), zygoma fractures (ZMC, *isolated zygomatic arch*), maxilla (Le Fort I, Le Fort II, Le Fort III, palate), and other fractures (orbital floor, NOE, frontal) | Traffic accident (n=236; 89.8%), fall (n=14; 5.3%), violence (n=4; 1.5%), gunshot (n=3; 1.1%), sports injury (n=2; 0.8), and other causes (n=4; 1.5%) | With a total of 263 cases, the most common cause was traffic accidents (89.8%). Mandibular fracture was the most common fracture with 223 (44.2%) cases (consisting of parasymphyseal fracture 61 (27.4%) cases, body 50 (22.4%), condyle 45 (20.2%), angle 40 (17.9%), symphysis 16 (7.2%), ramus 7 (3.1%) and coronoid 4 (1.8%) cases). There were 116 cases of zygoma fracture, 74 cases of maxillary fracture, and 91 cases of other fractures. |
| Al-Bokhamseen M, Salma R, Al-Bodbaij M. | 2019 | Retrospective | Patterns of maxillofacial fractures in Hofuf, Saudi Arabia: A 10-year retrospective case series | Of the 270 patients, 241 (89.3%) were male, and 29 (10.7%) were female. The age range was 2 - 77 years with a mean age of 24.29 years (SD = 11.89). | Hard Tissue Trauma | Fracture of mandible (symphysis, parasymphysis, body, angle, ramus, condyle, coronoid), midface, maxilla (Le Fort I, Le Fort II, Le Fort III, palate) | Traffic accident (n=171; 63.3%), fall (n=43; 15.9%), sports injury (n=22; 8.1%), violence (n=18; 6.7%), industrial injury (n=8; 3%), animal attack (n=6; 2.2%), and gunshot (n=2; 0.7%) | Of the 270 patients, 476 maxillofacial fractures were found. The most common fracture was the mandible in 167 (61.9%) patients with a total of 260 fractures (consisting of symphysis, parasymphysis, body, angle, ramus, condyle, and coronoid fractures). Midface fractures were recorded in 141 (52.2%) patients with a total of 216 fractures (consisting of Le Fort I, Le |

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| | | | | | | | | Fort II, Le Fort III, palatal, *zygomaticomaxillary complex,* orbital, and NOE fractures). |
| Vlavonou S, Nguyen TM, Touré G | 2018 | Retrospective | Epidemiology of facial fractures in the elderly | 157 patients, aged 65 to 100 years, 69% of whom were female and 31% male. | Hard Tissue Trauma | Nasal Fracture, Orbital (*floor*, *medial wall*, *lateral wall*), Maxillary Sinus Fracture, Zygoma Fracture, Mandible, Zygomatic Arch Fracture, Le Fort type I | Mechanical falls (59%), 8% falls due to fatigue, 6% motor vehicle accidents, 2% occurred due to physical aggression, 2% of patients were found on the ground, 1% were due to other medical problems, 1% due to blunt objects, 1% due to work-related causes, and 20% due to unknown causes. | Nasal fractures occurred in 64 patients (32%), orbital floor fractures in 46 patients (23%), maxillary sinus fractures in 25 patients (13%), zygoma fractures in 18 patients (9%), mandibular fractures in 14 patients (7%), zygomatic arch fractures in 12 patients (6%), lateral wall (5%), medial wall in 8 patients (4%), and Le Fort type I in 1 patient (1%). |
| Liu XD, Wang QX, Liu WX | 2020 | Retrospective | Epidemiological pattern of maxillofacial fractures in northern China: A retrospective study of 829 cases | There were 829 patients, 624 males (75.27%) and 205 females (24.73%). Their mean age was 36.1 years (range, 1-89 years). | Hard Tissue Trauma | Mandibular fractures (*parasymphysis*, *condyle*), Orbital (*lower rim*, *floor*, *medial wall*, *lateral wall*), Maxillary fractures (Le Fort type II, Le Fort type I and Le Fort type III), Zygomatic fractures | Traffic accidents (45.72%), falls (30.88%), violence (8.68%), sports injuries, blast injuries, and accidental injuries (8.81%), and industrial injuries (5.91%) | Mandibular fractures in 389 patients (47%, parasymphysis and condyles were the most commonly affected sites). Orbital fractures in 242 patients (30%). Among orbital fractures, lower edge and base fractures were the most commonly seen (n=197, 13.26%), followed by medial wall (n=140, 9.42%) and lateral wall fractures (n=98, 6.59%). Maxillary fractures in 241 (29%) patients, 32 patients had Le Fort type I, 59 patients Le Fort type II, and 28 patients Le Fort type III fractures. And zygomatic fractures in 222 (27%) patients. |
| Mukhopadhyay S, Galui S, Biswas R, Saha S, Sarkar S. | 2020 | Retrospective | Oral and maxillofacial injuries in children: a retrospective study | Of the 232 pediatric patients, there were 134 males (57.8%) and 98 females (42.2%). The age range was 0-12 years (mean age 6.77±3.25 years). | Hard and Soft Tissue Trauma | Facial bone fractures (mandibular, nasal, maxillary, zygomatic, orbital), dentoalveolar fractures, and soft tissue trauma | Fall from height (56.5%), motor vehicle accident (16.8%), playground accident (12.1%), bicycle accident (6%), tube *well* handle trauma (3.9%), animal attack (2.6%), interpersonal violence (1.3%), foreign body (0.9%). | A total of 112 fascial bone fractures were observed in 99 patients. Mandibular fractures were the most frequent, accounting for 82.8% (82/99) of cases, nasal fractures in 22 patients (22.2%), maxillary (n=4; 4%), zygomatic (n=2; 2%) and orbital (n=2; 2%). Dentoalveolar fractures were found in 143 patients (61.6%), and 133 patients (57.3%) had 1 or more soft tissue trauma. |
| Sbordone C, Barca I, Petrocelli M, Dell'Aversana Orabona G, Vaira LA, Colangeli W, et al. | 2018 | Retrospective | The Influence of Socioeconomic Factors on the Epidemiology of Maxillofacial Fractures in Southern Italy | There were 987 maxillofacial patients treated from 2011-2015, including 657 males and 310 females. Age range 0-100 years. | Hard Tissue Trauma | Mandibular trauma, orbito-maxillo-zygomatic complex trauma, *orbital walls*, nasal bone trauma, maxillary trauma, NOE, and frontal sinus fracture | Violence/assault (n=294; 30.4%), traffic accident (n=263; 27.2%), fall (n=224; 23.2%), sports injury (n=149; 15.4%), and other causes (n=37; 2.6%) | Of the 967 patients, there were a total of 1128 fractures. Mandibular fractures were the most frequent (n=399; 35.4%), followed by orbito-maxillo-zygomatic complex (n=337; 29.9%), orbital wall (n=160; 14.2%), nasal bone (n=129; 11.4%), maxillary fracture (n=48; 4.3%), NOE (n=33; 2.9%), and frontal sinus fracture (n=22; 2%). In the group with mandibular fractures, the condyles were the most frequently involved segment (n=114; 10.1%). |
| Boom LJ, Wolvius EB, Rozeboom AVJ | 2022 | Retrospective | Impact of COVID-19 lockdown on incidence of maxillofacial fractures: A retrospective analysis | There were 130 patients with 94 (72.3%) males and 36 (27.7%) females. Mean age was 43.5 years (SD = 21.5 years). Patients were divided into three different groups: *pre-lockdown* group (2018 and 2019), *lockdown* group (2020) and *post-lockdown* group (2021). | Hard Tissue Trauma | Orbital Fracture, Zigomaticomaxillary Complex Fracture, Mandibular Fracture, Maxillary Fracture, Nasal Fracture, and Frontral Sinus Fracture | Pre-lockdown: traffic accident (n=42), violence (n=16), fall (n=15), sports injury (n=2), work accident (n=1), and unknown cause (n=1).<br><br>Lockdown: traffic accidents (n=11), falls (n=4), and violence (n=4).<br><br>Post-lockdown: falls (n=16), violence (n=7), traffic accidents (n=7), and sports injuries (n=4). | In the *pre-lockdown* group (2018-2019) there were 77 maxillofacial fracture patients, with orbital fractures being the most frequent (n=39), followed by zygomatic complex fractures (n=34), mandibular fractures (n=25), maxillary fractures (n=20), nasal fractures (n=13), and frontal sinus fractures (n=8).<br><br>The *lockdown* group (2020) consisted of 19 patients. Orbital fractures were most common (n=13), followed by maxillary fractures (n=9), zygomatic complex fractures (n=7), nasal fractures (n=6), frontal sinus fractures (n=4), and mandibular fractures (n=1).<br>The *post- lockdown* (2021) group had 34 patients. Mandibular fractures were most common (n=17), followed by orbital (n=16), |

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| | | | | | | | | ZMC (n=8), maxillary (n=8), nasal (n=7), and frontal sinus (n=2) fractures. |
| Philip G, Dominic S, Poorna T A, EK J. | 2022 | Retrospective | Pattern of maxillofacial fractures in a Tertiary Referral Center in Central Kerala - A comparison between the Pre-COVID and COVID periods | 2600 cases in total<br>Group 2019 (Pre-COVID-19): 1691 patients<br>Group 2020 (During COVID-19): 909 patients<br>Age range from 10 months - 98 years | Hard Tissue Trauma | Dentoalveolar fracture, ZMC, frontal bone, nasal bone, NOE, *zygomatic arch*, maxilla, mandible, condyle, primary tooth fracture. | Group 2019: traffic accidents (64.6%), violence/assault (11.7%), falls at home (9.5%), sports injuries (4.3%), falls from height (3.8%), mass casualty incidents (3.7%), and occupational accidents (2.4%).<br><br>Group 2020: traffic accidents (67.1%), falls at home (17.8%), violence/assault (7.9%), sports injuries (2.5%), falls from height (2.4%), workplace accidents (2.0%), and mass casualty incidents (0.3%). | Group 2019: There were 1691 maxillofacial trauma patients, with dentoalveolar fractures being the most frequent (n=691; 40.9%), followed by ZMC (n=422; 25%), mandibular (n=229; 13.5%), maxillary (n=210; 12.4%), fracture of frontal bone (n=193; 11.4%), nasal bone (n=135; 8%), condyle (n=131; 7.7%), NOE (n=93; 5.5%), zygomatic arch (n=47; 2.8%), and primary tooth fracture (n=7; 0.4%).<br><br>Group 2020: There were 909 maxillofacial trauma patients, with dentoalveolar fractures being the most frequent (n=301; 33.1%), followed by ZMC (n=288; 31.7%), frontal bone (n=137; 15.1%), nasal bone (n=112; 12.3%), maxillary fracture (n=109; 12%), mandible (n=92; 10.1%), NOE (n=78; 8.6%), condyle (n=64; 7%), zygomatic arch (n=28; 3.1%), and primary tooth fracture (n=5; 0.6%). |
| Yeung E, Brandsma DS, Karst FW, Smith C, Fan KFM | 2021 | Retrospective | The influence of 2020 coronavirus lockdown on presentation of oral and maxillofacial trauma to a central London hospital | The 2019 group (Pre-COVID-19) totaled 192 patients, consisting of 141 men and 51 women. The age range was 0.7-89 years.<br><br>Group 2020 (During COVID-19) totaled 70 patients, consisting of 44 males and 26 females. The age range was 1-91 years. | Hard and Soft Tissue Trauma | Bone trauma (mandible, *midface*, nasal bone, orbit, zygoma, frontal, stiloideus processus), dental trauma (avulsion, luxation, dentoalveolar, tooth fracture), soft tissue trauma (laceration, contusion). | Group 2019: falls (46.9%), interpersonal violence (22.9%), traffic accidents (9.4%), *accidental self-harm* (8.3%), domestic violence (5.2%), sports injuries (4.2%), and dog bites (3.1%).<br>Group 2020: falls (52.9%), interpersonal violence (24.3%), traffic accidents (11.4%), sports injuries (4.3%), *accidental self-harm* (2.9%), *deliberate self-harm* (2.9%), domestic violence (1.4%). | Group 2019: Soft tissue trauma was 152 patients (consisting of lacerations (n=110; 72.4%) and contusions (n=42; 27.6%)), bone trauma was 42 patients (with mandibular fractures being the most frequent (n=20; 47.6%) followed by orbital trauma (n=8; 19%)), and dental trauma was 28 patients (with lacerations being the most frequent (n=11; 39.3%).<br>Group 2020: soft tissue trauma 51 patients (with laceration being the most frequent (n=49; 96.1%)), bone trauma 12 patients (with mandibular fracture being the most frequent (n=4; 33.3%)), and dental trauma 12 patients (with avulsion being the most frequent (n=5; 41.7%)). |
| Hoffman GR, Walton GM, Narelda P, Qiu MM, Alajami A. | 2021 | Retrospective | COVID-19 social-distancing measures altered the epidemiology of facial injury: a United Kingdom-Australia comparative study | Group 2019 252 patients in total, comprising 103 patients in Australia and 149 patients in the UK<br><br>Group 2020 110 patients in total, comprising 73 patients in Australia and 37 patients in the UK<br><br>Age range 0-100 years | Hard and soft tissue trauma | Trauma to bone (ZMC, orbit, *pan-facial*, NOE, mandible, frontal bone, dentoalveolar), soft tissue trauma, polytrauma | Group 2019<br>Australia: Interpersonal violence, falls, sports injuries, motor vehicle accidents, animal bites, workplace accidents.<br>UK: Interpersonal violence, fall, unknown cause, sports injury, motor vehicle accident<br>Group 2020<br>Australia: Falls, interpersonal violence, sports injuries, motor vehicle accidents, animal bites, domestic violence , work accidents<br>UK: Falls, interpersonal violence, unknown cause, animal bites, motor vehicle accidents | Group 2019<br>Australia: Bone trauma in 54 patients (ZMC being the most frequent with 22 patients, followed by orbital in 15 patients), *isolated* soft tissue trauma (n=26), and polytrauma in 23 patients.<br>UK: *Isolated* soft tissue trauma (n=88), bone trauma in 49 patients (mandible being the most frequent with 28 patients, followed by orbital in 14 patients), and polytrauma in 5 patients.<br>Group 2020<br>Australia: Bone trauma in 43 patients (orbital being the most frequent with 14 patients, followed by mandibular in 11 patients), *isolated* soft tissue trauma (n=16), and polytrauma in 13 patients.<br>UK: Bone trauma in 16 patients (mandible being the most frequent with 6 patients, followed by ZMC in 5 patients), polytrauma in 15 patients, and *isolated* soft tissue trauma in 6 patients. |
| Lee DW, Choi SY, Kim J wook, Kwon TG, Lee ST | 2021 | Retrospective | The impact of COVID-19 on the injury pattern for maxillofacial fracture | A total of 447 patients were divided into 2 groups, 253 patients in the pre-COVID-19 2019 group (186 men and 67 women, median | Hard Tissue Trauma | Mandibular Fractures (Symphysis, *Body*, *Angle*, Ramus), Intracapsular Fractures, Extracapsular | In the 2019 group: falls (n=107, 42%), motor vehicle accidents (n=68; 27%), violence (n=40; 16%), other accidents (n=13; | The 2019 group was 253 patients, with symphysis mandibular fractures (n=80; 41%), intracapsular fractures (n=54; 28%), mandibular angle fractures (n=51; 26%), extracapsular fractures |

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| | | | in Daegu city, South Korea | age 38 years), and 194 patients in the *COVID-19* 2020 group (147 men and 47 women, median age 34 years). | | Fractures, Coronoid Fractures, Maxillary Fractures (Le Fort 1 and 2), Zigomaticomaxillary Complex Fractures | 5%), sports injuries (n=11; 4%), work accidents (n=10; 4%), falls from height (n=4; 2%). In the 2020 group: falls (n=88; 45%), motor vehicle accidents (n=50; 26%), violence (n=32; 16%), work accidents (n=13; 7%), other accidents (n=8; 4%), sports injuries (n=2; 1%), falls from height (n=1; 1%). | (n=50; 26%), mandibular body fracture (n=25; 13%), mandibular ramus fracture (n=7; 4%), zygomaticomaxillary complex fracture (n=9; 5%), Le Fort 2 (n=7, 4%), Le Fort 1 (n=6; 3%), and coronoid fracture (n=4; 2%).<br><br>Group 2020 had 194 patients, with symphysis mandibular fractures (n=96; 38%), intracapsular fractures (n=85; 34%), mandibular angle fractures (n=70; 28%), extracapsular fractures (n=42; 17%), mandibular body fracture (n=40; 16%), mandibular ramus fracture (n=13; 5%), Le Fort 1 (n=11; 4%), zygomaticomaxillary complex fracture (n=8; 3%), Le Fort 2 fracture (n=8; 3%), and coronoid fracture (n=4; 2%). |
| Infante-Cossio P, Fernandez-Mayoralas-Gomez M, Gonzalez-Perez LM, et al. | 2022 | Retrospective | Impact of the coronavirus pandemic on maxillofacial trauma: A retrospective study in southern Spain | A total of 150 patients divided into 2 groups.<br>Pre-pandemic group (2019-2020): 91 patients (72 male, 19 female).<br>Pandemic group (2020-2021): 59 patients (49 males, 10 females).<br>Age range: 14 - 60 years | Hard Tissue Trauma | Mandibular, orbito-zigomatic, panfacial, maxillary fractures | Pre-pandemic group: falls (n=33; 36.3%), interpersonal violence (n=32; 35.2%), traffic accidents (n=20; 22%), and sports injuries (n=6; 6.6%).<br><br>Pandemic group: traffic accidents (n=20; 33.9%), falls (n=20; 33.9%), interpersonal violence (n=16; 27.1%), and sports injuries (n=3; 5.1%) | Pre-pandemic group: 91 cases with mandibular fractures being the most frequent (n=55; 60.4%), followed by orbito-zigomatic (n=21; 23.1%), panfacial fractures (n=12; 13.2%), and maxillary fractures (n=3; 3.3).<br><br>Pandemic group: 59 cases with mandibular fractures remaining the most frequent (n=32; 54.2%), followed by orbito-zigomatic fractures (n=13; 22%), panfacial fractures (n=12; 20.3%), and maxillary fractures (n=2; 3.4%). |
| Salzano G, Dell' G, Orabona A, Audino G, Luigi Ã, Vaira A, et al. | 2021 | Retrospective | Have There Been any Changes in the Epidemiology and Etiology of Maxillofacial Trauma During the COVID-19 Pandemic? An Italian Multicenter Study | A total of 309 patients divided into 2 groups, namely the 2019 group of 236 patients (170 men with an average age of 37.1 years and 66 women with an average age of 43.5 years) and the 2020 group of 73 patients (53 men with an average age of 40.1 years and 20 women with an average age of 53.6 years). | Hard Tissue Trauma | Mandibular Fractures (Dento-alveolar, Symphysis/Parasymphysis, Body, Angle/Ramus, Coronoid, *Condylar Process*), Maxillary Fractures (*Palate-alveolar*, Le Fort 1, Le Fort 2, Le Fort 3), Nose Fractures, NOE, Orbital, Zygoma, Frontal Sinus | In the 2019 group: falls (n=75; 31.8%), violence (n=54; 22.9%), traffic accidents (n=51; 21.6%), sports injuries (n=40; 16.9%), work accidents (n=12; 5.1%), animal attacks (n=3; 1.3%), iatrogenic (n=1; 0.4%).<br>In the 2020 group: falls (n=37; 50.7%), traffic accidents (n=16; 21.9%), violence (n=10; 13.7%), work accidents (n=7; 9.6%), suicide attempts (n=2; 2.7%), sports injuries (n=1; 1.4%). | The 2019 group totaled 236 patients with a total of 325 fractures. The most common was mandibular fracture with 115 (35.4%) fractures (Condylar process 12.9%; Symphysis/Parasymphysis 10.5%; Body 6.1%; Angle/Ramus 6.1%), nasal fractures 73 (22.5%) fractures, zygoma 64 (19.7%) fractures, orbital 51 (15.7%) fractures, maxillary 18 (5.5%) fractures, frontal sinus 3 (0.9%) fractures, and NOE 1 (0.3%) fracture.<br>Group 2020 had 73 patients with a total of 114 fractures. The most common were mandibular fractures with 36 (31.6%) fractures (condylar process 14%; symphysis/parasymphysis 5.3%; angle/ramus 5.3%; body 4.4%); dentoalveol ar 1.7%, coronoid 0.9%), zygoma 32 (28.1%) fractures, orbital 21 (18.2%) fractures, nasal 13 (11.4%) fractures, maxillary 5 (4.4%) fractures, frontal sinus 5 (4.4%) fractures, and NOE 2 (1.7%) fractures. |

Source: Primary Data 2020

Table 2. Distribution of research results regarding the etiology of maxillofacial trauma before and during the COVID-19 pandemic

| Etiology | Amount of Literature | |
|---|---|---|
| | Before Pandemic | During the Pandemic |
| Industrial injury | 2 (literature number 3, 5) | 0 |

| | | |
|---|---|---|
| Sports injuries | 11 (literature numbers 1, 2, 3, 5, 8, 9, 10, 11, 12, 13, 14, 15) | 7 (literature number 9, 10, 11, 12, 13, 14, 15) |
| Iatrogenic | 1 (literature number 15) | 0 |
| Mass casualty incident | 1 (literature number 10) | 1 (literature number 10) |
| Fall (general) | 15 (literature numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15) | 7 (literature numbers 9, 10, 11, 12, 13, 14, 15) |
| Falling from a height | 4 (literature numbers 6, 7, 10, 13) | 2 (literature numbers 10, 13) |
| Work accident | 6 (literature numbers 4, 9, 10, 12, 13, 15) | 4 (literature numbers 10, 12, 13, 15) |
| Other accidents | 1 (literature number 13) | 1 (literature number 13) |
| Traffic accidents/motor vehicle accidents | 15 (literature numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15) | 7 (literature number 9, 10, 11, 12, 13, 14, 15) |
| Interpersonal violence/violence | 15 (literature number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15) | 7 (literature number 9, 10, 11, 12, 13, 14, 15) |
| Gunshot/firearm wound | 3 (literature numbers 2, 3, 7) | 0 |
| *Self-harm (accidental)* | 1 (literature number 11) | 1 (literature number 11) |
| *Self-harm (deliberate)* | 0 | 2 (literature 11, 15) |
| Animal attack | 5 (literature numbers 3, 6, 11, 12, 15) | 1 (literature number 12) |
| Other causes | 4 (literature numbers 1, 2, 4, 8) | 0 |
| Unknown cause | 3 (literature numbers 4, 9, 12) | 1 (literature number 12) |

Table 3. Distribution of research results regarding the type of maxillofacial trauma before and during the COVID-19 pandemic

| **Maxillofacial Trauma Type** | **Number of Literature** | |
|---|---|---|
| | **Before Pandemic** | **During Pandemic** |
| Upper and Midface Fractures | | |
| Orbital | 13 (literature numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 14, 15) | 5 (literature number 9, 11, 12, 14, 15) |
| Maxilla | | |
| Le Fort I | 8 (literature numbers 1, 2, 3, 4, 5, 8, 13, 15) | 2 (literature number 13, 15) |
| Le Fort II | 7 (literature numbers 1, 2, 3, 5, 8, 13, 15) | 1 (literature number 13) |
| Le Fort III | 6 (literature numbers 1, 2, 3, 5, 8, 15) | 0 |
| Palate | 3 (literature numbers 2, 3, 5) | 1 (literature number 15) |
| Maxillary sinus | 1 (literature number 4) | 0 |
| Maxillary part not mentioned | 4 (literature numbers 6, 9, 10, 14) | 3 (literature numbers 9, 10, 14) |
| Zygomatic | | |

| | | |
|---|---|---|
| Zygoma bone | 6 (literature numbers 1, 4, 5, 6, 11, 14) | 2 (literature number 11, 14) |
| ZMC | 8 (literature number 2, 3, 8, 9, 10, 12, 13, 15) | 5 (literature numbers 9, 10, 12, 13, 15) |
| *Zygomatic Arch* | 6 (literature numbers 2, 3, 4, 7, 10, 15) | 2 (literature number 10, 15) |
| Nasal | 9 (literature numbers 1, 4, 6, 7, 8, 9, 11, 12, 15) | 4 (literature numbers 9, 11, 12, 15) |
| NOE | 6 (literature numbers 2, 3, 8, 10, 12, 15) | 3 (literature number 10, 12, 15) |
| Frontal Sinus | 6 (literature numbers 2, 7, 8, 9, 10, 12) | 4 (literature number 9, 10, 11, 12) |
| Mandibular Fracture | | |
| Ramus | 7 (literature numbers 1, 2, 3, 7, 8, 13, 15) | 2 (literature numbers 13, 15) |
| Condylar | 8 (literature numbers 1, 2, 3, 5, 7, 8, 10, 15) | 2 (literature number 10, 15) |
| Subcondylar | 2 (literature number 1, 7) | 0 |
| Angle | 7 (literature numbers 1, 2, 3, 7, 8, 13, 15) | 2 (literature number 13, 15) |
| Body | 6 (literature number 1, 2, 3, 8, 13, 15) | 2 (literature number 13, 15) |
| Symphysis | 7 (literature numbers 1, 2, 3, 7, 8, 13, 15) | 2 (literature number 13, 15) |
| Parasymphysis | 6 (literature numbers 1, 2, 3, 5, 7, 15) | 1 (literature number 15) |
| Mandibular part not mentioned | 7 (literature numbers 4, 6, 9, 10, 11, 12, 14) | 5 (literature number 9, 10, 11, 12, 14) |
| Coronoid process | 5 (literature numbers 1, 2, 3, 8, 13) | 2 (literature number 13, 15) |
| Dental trauma | 1 (literature number 11) | 1 (literature number 11) |
| Dentoalveolar | 4 (literature numbers 1, 6, 10, 12) | 3 (literature number 10, 11, 15) |
| Tooth Fracture | 1 (literature number 10) | 1 (literature number 10) |
| Soft Tissue Trauma | 3 (literature numbers 1, 6, 11) | 1 (literature number 11) |

## Discussion

Rapid review appears to synthesize knowledge with components of systematic review but simplified or eliminated to produce information in less time and fewer resources to meet the needs of decision-makers. This simplified process is known as a "shortcut" and, although it may decrease reliability in conclusions, research concludes that, especially in therapeutic interventions, it does not drastically alter outcomes (Tapia-Benavente et al., 2021).

Maxillofacial trauma is any physical trauma to the facial region, commonly encountered by maxillofacial surgeons, and is often associated with high morbidity. The maxillofacial region can be divided into three parts: (i) upper face - frontal bone and frontal sinuses (ii) middle face - nasal, ethmoid, zygomatic, and maxillary bones; and (iii) lower face - mandible. Maxillofacial injuries may occur as an isolated injury or may be associated with multiple injuries to the head, chest, abdomen, spine, and extremities causing emotional and physical trauma to the patient. The aetiology of maxillofacial injuries varies with road traffic accidents (RTA), being the

leading cause of maxillofacial fractures in developing countries, while interpersonal violence is the leading cause in developed countries (Abhinav et al., 2019).

Maxillofacial trauma occurs in a large number of severely injured patients and may be a concomitant sign of serious or life-threatening injury, which may not be immediately apparent on arrival at the emergency scene (Peeters et al., 2016). The epidemiology of maxillofacial fractures varies according to age group, cause of injury, and type of fracture and also depends on the group studied. The incidence of maxillofacial trauma varies from region to region globally (Pungrasmi & Haetanurak, 2018).

The Coronavirus Disease 2019 (COVID-19) pandemic caused by acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has had a profound impact on the behaviors and habits of populations, communities, and individuals. Governmental and private measures were taken to limit the spread of the virus and reduce healthcare burden including stay-at-home orders, statewide curfews, social distancing, and self-quarantine (Stanisce et al., 2022). This represents one of the biggest challenges to the healthcare system, and has forced medical specialties to rapidly adapt their approach to patient care. Oral and Maxillofacial Surgery is one of the professions considered to be particularly at risk of disease transmission due to aerosol formation during surgical interventions, patient proximity and the operating environment (Blackhall et al., 2020). Non-urgent and elective care is temporarily suspended in an effort to minimize exposure to the virus and its burden on the healthcare system (Stanisce et al., 2022).

The pandemic situation will certainly affect the picture of the incidence of maxillofacial trauma before and during the pandemic. Research conducted by AlHammad, et al. in 2020 in Riyadh, Saudi Arabia stated that in the period January 1, 2016 - December 31, 2017 there were 372 patients with maxillofacial trauma (AlHammad et al., 2020). Research by Assiri, et al. in the same location, showed the prevalence and pattern of maxillofacial fractures from 2005 - 2014 and recorded 263 cases (Assiri et al., 2020). Research by Al-Bokhamseen et al. in 2019 in Hofuf, Saudi Arabia also showed the pattern of maxillofacial fractures for 10 years, namely from January 1, 2007 to December 31, 2016, the results were 270 patients recorded, with 476 maxillofacial fractures found (Al-Bokhamseen et al., 2019). Furthermore, a study by Vlavonou, et al. in Villeneuve-Saint-Georges, France in 2018 showed the pattern of maxillofacial fractures in the region from January 1, 2014 - April 30, 2017, recording a total of 157 maxillofacial trauma patients (Vlavonou et al., 2018). In another region, Liu XD, Wang QX, Liu WX conducted a study in Shenyang, China in 2020, from August 2011 to July 2019, there were 829 patients with maxillofacial fractures (Xiao-Dong et al., 2020). Meanwhile, in Kolkata, India, research by Mukhopadhyay S, Galui S, Biswas R, Saha S, Sarkar S. in 2020 showed that in the period October 2016 to September 2018 there were 99 patients with a total of 112 fractures of the fascial bone found (Mukhopadhyay et al., 2020).

The incidence of maxillofacial trauma in children was noted in a study conducted by Bilgen F, Ural A, Bekerecioğlu M in Turkey. From January 2016 to December 2018, a total of 55 pediatric maxillofacial fracture patients were treated and followed-up, divided into three groups based on age (under 6 years, 6-12 years, and 13-18 years), with the highest incidence in the 13-18 years age group, with 23 patients. Maxillofacial injuries in children are less common than adult facial injuries, and account for 1% to 15% of all facial bone fractures (Bilgen et al., 2019).

The incidence and patterns of maxillofacial fractures vary from country to country depending on the prevailing geographical, social, cultural, and environmental factors (Prasad et al., 2018). Sbordone, et al. conducted a study on the incidence, etiology, and patterns of maxillofacial trauma in two different regions of Italy, which have different socioeconomic factors and personal behaviors. This study analyzed the epidemiology of maxillofacial fractures over a 5-year period, between January 2011 and December 2015, in 2 different cities in 2 Italian regions: Naples, a metropolitan city in the Campania region, which includes a population of 3,107,009

inhabitants and Catanzaro, in the Calabria region, which includes a population of 362,343. It was noted that the Naples region had 414 patients, while the Catanzaro region had 553 maxillofacial trauma patients (Sbordone et al., 2018).

Seven articles examining the incidence of maxillofacial trauma before and during the pandemic stated that during the pandemic, there was a decrease in reported cases. From the research of Boom LJ, Wolvius EB, and Rozeboom AVJ in 2022 in Rotterdam, the Netherlands, it was noted that in the pre-lockdown group (2018 and 2019) there were 77 patients, while in the lockdown group (2020) 19 patients, and the post-lockdown group was 34 patients (2021) (Boom et al., 2022). Research on the Asian continent conducted by Lee, et al. in 2021 in Daegu, South Korea, noted that in the group before COVID-19 (2019) there were 253 patients, while in the group during COVID-19 (2020) there were 194 patients (Lee et al., 2021). In India, a study by Philip G, Dominic S, Poorna T A, and EK J. in 2022, also showed changes in incidence in the period before and during the pandemic. In the pre-pandemic group (2019) there were 1691 patients with maxillofacial trauma, while in the group during the pandemic (2020) it decreased to 909 patients (Philip et al., 2022). Furthermore, in continental Europe, research by Salzano, et al. in 2021 in Italy, explained that in the pre-pandemic group (February 23 - May 23, 2019) there were 236 patients, but in the group during the pandemic (February 23 - May 23, 2020) there were only 73 patients with maxillofacial trauma (Salzano et al., 2021). A study by Infante-Cossio, et al. in 2022 in Seville, Spain also recorded changes in incidence, in the pre-pandemic group (2019-2020) there were 91 patients, while in the group during the pandemic (2020-2021) it decreased to 59 patients (Infante-Cossio et al., 2022). The decrease in incidence is thought to be due to reduced outdoor activities, such as sports due to social distancing during the COVID-19 pandemic (Lee et al., 2021; Salzano et al., 2021).

Literature discussing the characteristics of maxillofacial trauma in Asia reveals that traffic accidents and falls are the most frequent causative factors, both in the period before and during the pandemic. Research conducted in Saudi Arabia (Al-Bokhamseen et al., 2019; AlHammad et al., 2020; Assiri et al., 2020), stated that traffic accidents are still the most frequent cause of maxillofacial trauma. Research conducted by Philip, et al. in India also stated the same thing, that in the pre-pandemic group (2019) and the group during the pandemic (2020), traffic accidents were the most frequent cause of maxillofacial trauma, with a decrease in incidence.13 The rise of traffic accidents may be due to several things, such as the accessibility of many cars for very young people, driving at high speeds, not wearing seat belts, and ignoring traffic regulations.22,23 Meanwhile, a study conducted by Lee, et al. in 2021 in Daegu, South Korea, noted that in the 2019 and 2020 groups falls were the most frequent cause, followed by motor vehicle accidents and interpersonal violence.31

Literature examining the characteristics of maxillofacial trauma in Europe also mentions similar things. Research conducted by Boom, et al. in Rotterdam, the Netherlands explained that in the pre-lockdown period (2018 - 2019) the most frequent cause was traffic accidents, followed by violence and falls; in the lockdown period (2020): traffic accidents; and post-lockdown period: falls, followed by violence and traffic accidents.30 Furthermore, research by Salzano, et al. in Italy stated that in the 2019 group, the most frequent cause of maxillofacial trauma was falls, followed by interpersonal violence and traffic accidents. In the 2020 group, falls were also the most frequent factor, followed by traffic accidents and interpersonal violence.10

The types of maxillofacial trauma that occurred in the period before and during the pandemic have not changed much. Literature discussing the characteristics of maxillofacial trauma in Asia mostly states mandibular fracture as the most common type of maxillofacial trauma in the pre-pandemic period. Two studies conducted in Saudi Arabia22,23 described the most common type of maxillofacial trauma as mandibular trauma, followed by zygoma (ZMC and

isolated zygomatic arch). Meanwhile, one study also conducted in Saudi Arabia (AlHammad et al., 2020) stated that midface fractures were the most common type.

The types of maxillofacial trauma during the pandemic in Asia were described in a study by (Lee et al., 2021) in Korea and a study by (Philip et al., 2022) in India The study conducted by Lee, et al. explained that in the 2019 group the type of trauma that was often encountered was trauma to the mandibular symphysis, then intracapsular trauma (head of the condyle), mandibular angle, and extracapsular (neck of the condyle). Not much different from group 2020, namely mandibular symphysis, intracapsular, angle, extracapsular, and body trauma. Furthermore, the study by Philip, et al. explained that in the 2019 group, dentoalveolar fractures were the most common, followed by trauma to the ZMC. In the 2020 group, dentoalveolar fractures were still the most frequent type of trauma, but with the number of cases decreasing by more than half (Philip et al., 2022).

Furthermore, the types of maxillofacial trauma before and during the pandemic in continental Europe were described in studies by (Boom et al., 2022; Hoffman et al., 2021; Salzano et al., 2021; Yeung et al., 2021), 2021) Research conducted by Boom, et al. in Rotterdam, the Netherlands explained that in the pre-lockdown period the most common types of trauma were orbital trauma and ZMC; in the lockdown period were orbital and maxillary trauma; while in the post-lockdown period were mandibular and orbital trauma (Boom et al., 2022). Research conducted by Salzano, et al. in Italy showed that in the 2019 group, the most common type of trauma was mandibular trauma, followed by nasal and orbital trauma. In the 2020 group, mandibular trauma was still the most frequent type of trauma, followed by trauma to the orbitals, and nose (Salzano et al., 2021).

Yeung, et al. in their study in London, UK in 2021 mentioned that in the pre-pandemic group (2019), the most dominant type of maxillofacial trauma was soft tissue trauma (laceration and contusion), followed by mandibular fracture and dental trauma. Similarly, in the group during the pandemic (2020), soft tissue trauma was still the most prevalent, but with a decrease in cases. In this study, the greater proportion of the soft tissue laceration subcategory potentially reflects patients' desire not to present to the ED for simpler injuries such as bruising and swelling (soft tissue contusion) (Yeung et al., 2021). Furthermore, research by Hoffman, et al. examining maxillofacial trauma patterns in Australia and the United Kingdom in 2021, explained that in the 2019 group, in Australia the most frequent type of trauma was trauma to the facial bones (including ZMC and orbitals), and in the United Kingdom the most frequent type was isolated soft tissue trauma, followed by mandibular trauma. Meanwhile, the 2020 group experienced a slight change, in Austalia, trauma to the facial bones (including the orbitals and mandible) became the most dominant trauma, and in the United Kingdom the dominant trauma type changed to trauma to the facial bones, which included the mandible and ZMC) (Hoffman et al., 2021). The differences in maxillofacial trauma types between the studies presented may be related to the mechanism of injury and the location of the body receiving maximum impact (Al-Bokhamseen et al., 2019; Patil et al., 2018).

The types of maxillofacial trauma in children were recorded in a study conducted by Bilgen F, Ural A, and Bekerecioğlu M in Turkey. From January 2016 to December 2018, it was noted that in all three groups (<6 years old, 6-12 years old, and 13-18 years old), the most common type was mandibular fracture, followed by maxillary, orbital, zygoma, and nasal fractures. The most important reason for this is that pediatric bone structure is different from adults. Because a child's facial bones have not fully ossified, and the cartilage structure is abundant, the impact damages the soft tissue rather than damaging the bony skeleton. In addition to the flexibility of pediatric facial bones, the lack of complete paranasal pneumatization and the protection provided by the buccal fat pad seen in infants leads to a lower incidence of maxillofacial fractures in children despite the higher skull/body ratio in children (Bilgen et al., 2019).

Further research can be done by mapping or recording the incidence of maxillofacial trauma on an inter-center basis (in collaboration with several large hospitals in Indonesia) for mapping the needs of human resources or hospitals for the management of maxillofacial trauma in Indonesia.

## Conclusion

Based on the 15 articles reviewed in this study, it can be concluded that there are changes in the incidence, causes and types of maxillofacial trauma in the period before and during the COVID-19 pandemic. Fewer cases were recorded in the period during the pandemic due to lockdowns and stricter access to health facilities. In the pre-pandemic period, the most common causes of trauma were traffic accidents, falls, and interpersonal violence. Other contributing factors include sports injuries, work accidents, animal attacks, falls from height, gunshot wounds, industrial injuries, other accidents, iatrogenic, mass casualty incidents, other causes, and unknown causes. The most common types of maxillofacial trauma in the pre-pandemic period were trauma to the orbitals, mandible, and ZMC. In the period during the pandemic, the most frequent causative factors were traffic accidents, falls, violence, and sports injuries. Fewer causative factors were recorded, the presence of trauma causes being rare. The most common types of maxillofacial trauma during the pandemic were trauma to the mandible, orbitals, and ZMC.

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