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## Procjena traume lica, čeljusti i usta ovisno o spolu, dobi, uzroku i vrsti ozljede

### Assessment of Oro-Maxillofacial Trauma According to Gender, Age, Cause and Type of the Injury

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#### Sažetak

**Svrha:** Uzroci maksilofacijalnih ozljeda razlikuju se u zemljama diljem svijeta. U ovom istraživanju željeli su se istražiti pojavnost, vrste i uzroci maksilofacijalnih ozljeda s obzirom na dobne i spolne razlike pacijenata primljenih na Odjel za maksilofacijalnu kirurgiju KBC-a Osijek od siječnja 2011. do prosinca 2013. **Ispitanici i postupci:** Sudjelovala su ukupno 64 pacijenta – 41 muškarac (64,1 %) i 23 žene (35,9 %) u dobi od 18 do 86 godina (srednja dob 42). Prikupljeni podatci analizirani su s obzirom na spol, dob, uzrok i vrstu maksilofacijalne ozljede. **Rezultati:** Najčešći uzrok ozljeda u oba spola bio je pad (39 % muškaraca; 65 % žena). Sljedeći najčešći uzrok ozljeda kod muškaraca bila je tučnjava (29 %), a kod žena prometna nezgoda (26 %) ( $p < 0,05$ ). Najčešća vrsta ozljede u oba spola bila je koštana (50 %; kod muškaraca zigomatična kost – 55 %, kod žena mandibula – 40 %) ( $p > 0,05$ ). Najčešći uzrok ozljeda kod najmlađih pacijenata bila je tučnjava (43 %), a kod ostalih pad (50 – 70 %;  $p < 0,05$ ). Najčešća vrsta ozljede u svim dobnim skupinama bila je koštana (više od 50 %;  $p > 0,05$ ). Većina padova i ozljeda nastalih u tučnjavama uzrokovali su koštane ozljede, a ozljede mekih i dento-alveolarnih tkiva bile su prouzročene prometnim i sportskim ozljedama ( $p > 0,05$ ). **Zaključak:** Podatci prikupljeni u ovom istraživanju pružaju vrlo važne informacije za provedbu buduće prevencije ozljeđivanja.

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#### Ključne riječi

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#### Uvod

Pojavnost i uzroci orolno-maksilofacijalnih trauma razlikuju se u zemljama diljem svijeta. Čini se da neke socijalno-ekonomske, edukacijske i kulturalne razlike, te okruženja, prometna pravila i konzumacija alkohola, utječu na pojavnost ove vrste ozljeda (1 – 4).

Teške ozljede lica vrlo su česte vjerojatno zbog slabije zaštite i znatne izloženosti područja lica, a prema istraživanju MacKenzija obuhvaćaju gotovo 50 posto svih traumom izazvanih smrtnih ishoda (5).

Rezultati različitih istraživanja pokazali su značajnu razliku u uzrocima maksilofacijalnih trauma, ovisno o razini razvijenosti pojedinih zemalja.

Rezultati istraživanja upućuju na to da je glavni uzrok ove vrste ozljeda u razvijenim zemljama napad, a slijede prometne i pješачke nezgode, sport i ozljede na radu (6 – 11). S druge strane, u nerazvijenim državama glavni su uzrok ove vrste ozljeda prometne nezgode, zatim napadi i ratna stanja (12 – 17).

#### Introduction

The occurrence and causes of maxillofacial trauma vary in different regions of the world. It seems that that some socio-economical, educational, cultural and environmental differences, as well as traffic regulations and alcohol consumption influence the incidence of the injuries (1-4).

Severe facial lesions occur very often due to little protection and significant exposure of the facial region, and according to MacKenzie's research account for almost 50% of all traumatic deaths (5).

The results of different studies have shown the significant difference in maxillofacial trauma causes dependant on the level of development of different countries.

According to the results of research in developed countries, assault is the first leading cause of this type of injuries, followed mostly by automobile accidents, pedestrian collisions, sports and industrial accidents (6-11).

Također se čini da se različite vrste ozljeda, poput maksilarnih i mandibularnih koštanih fraktura, lezija mekih tkiva, dentalnih trauma i kombinacija već navedenih ozljeda, pojavljuju u točno određenim situacijama (6, 18, 19).

Gassner i suradnici istaknuli su da se kod pacijenata stradalih u prometnim nezgodama koštane frakture pojavljuju u 25 posto slučajeva, ozljede mekih tkiva u 58 posto slučajeva, a dentalne traume u 49 posto slučajeva kod ozljeda nastalih tijekom svakodnevnih aktivnosti i u igri (6).

Svrha ovog istraživanja bila je istražiti pojavnost, vrste i uzroke maksilofacijalnih ozljeda, ovisno o spolu i dobi pacijenata primljenih na Odjel za maksilofacijalnu kirurgiju KBC-a Osijek od siječnja 2011. do prosinca 2013. godine. Nulta hipoteza ovog istraživanja bila je da ne postoji razlika u vrstama i uzrocima maksilofacijalnih ozljeda prema spolu i dobi pacijenata.

### Ispitanici i postupci

Ukupno su na Odjelu za maksilofacijalnu kirurgiju KBC-a Osijek, u razdoblju od siječnja 2011. do prosinca 2013. godine, pregledana 83 pacijenta s dijagnosticiranim maksilofacijalnim ozljedama.

Kriteriji za uključivanje u istraživanje bili su odsutnost istodobnih ozljeda drugih dijelova tijela te vrijednost Glasgow coma scorea od 15 (otvaranje očiju te verbalna i motorička reakcija) (20). S obzirom na to da je 15 pacijenata imalo i ozljede ruku i nogu, a četiri su imala Glasgow coma score 13, oni su isključeni iz istraživanja. Izolirane ozljede nosa također su isključene.

Naposljetku su u istraživanju sudjelovala 64 pacijenta – 41 muškarac (64,1 %) i 23 žene (35,9 %) u dobi od 18 do 86 godina (srednja vrijednost godina 42). Nitko nije prijavio konzumaciju alkohola neposredno prije ozljeđivanja.

Maksilofacijalne ozljede za ovo istraživanje dijagnosticirane su nakon detaljnog kliničkog i radiološkog pregleda pacijenta. Ozljede u području glave klasificirane su kao mekotkivne ozljede, koštane ozljede, mekotkivne i koštane ozljede, mekotkivne i dento-alveolarne ozljede te kombinirane ozljede (meko, koštano i dento-alveolarno tkivo). Pacijenti su prijavili sljedeće uzroke ozljeđivanja: tučnjavu, pad, prometnu ili sportsku nezgodu, ozljedu nastalu tijekom rekreativnih aktivnosti ili ozljedu na radu.

Svi podatci uneseni su u statistički program SPSS 19.0 (SPSS, Chicago, IL, SAD). Za procjenu različitosti vrsta i uzroka maksilofacijalnih ozljeda, ovisno o dobi i spolu pacijenata, koristili smo se  $X^2$  testom.

### Rezultati

U istraživanju su sudjelovala ukupno 64 pacijenta s oralo-maksilofacijalnim ozljedama, a liječeni su na Odjelu za maksilofacijalnu kirurgiju KBC-a Osijek od siječnja 2011. do prosinca 2013. godine.

Ukupno je obrađen 41 muškarac (64,1 %) i 23 žene (35,9 %), s omjerom muškaraca i žena od 2,78 : 1.

On the other hand, the leading causes of maxillofacial trauma in underdeveloped countries are road traffic accidents, followed by assaults and warfare (12-17).

It also seems that different types of injuries, such as maxillary and mandible bone fractures, soft tissue lesions, dental trauma and combinations of the above mentioned occur in certain situations (6,18,19).

Gassner et al. reported 25% of bone fractures and 58% of soft tissue lesions in patients involved in traffic accidents and 49% of dental trauma during activities of daily life and play accidents (6).

The aim of this study was to identify the occurrence, types and causes of maxillofacial injuries according to the age and gender differences in patients treated at Department of Maxillofacial Surgery, University Hospital Osijek between January 2011 and December 2013. The null hypothesis of this study was that there are no differences in types and causes of the maxillofacial injuries in different age and gender groups of patients.

### Materials and methods

A total of 83 patients with maxillofacial injuries were diagnosed and treated at Department of Maxillofacial Surgery in Osijek between January 2011 and December 2013.

The criteria for the inclusion in the study were the absence of any signs of concomitant injuries of other body parts as well as the patient's Glasgow coma score 15 (eye opening, verbal and motor response) (20). Since there were 15 patients with the injuries of arms and legs too and 4 patients received Glasgow coma score 13, they were excluded from the study. Isolated nose injuries were also excluded from the study.

Finally, 64 patients, 41 males (64.1%) and 23 females (35.9%), aged from 18 to 86 years (mean age 42) participated in the study. None of the patients reported alcohol consumption prior to the injury.

In this study maxillofacial injuries were diagnosed after a detailed clinical and radiological examination. The traumatic injuries associated with the facial region were classified as soft-tissue injury, bone injury, soft-tissue and bone injury, soft-tissue and dentoalveolar injury and combined injury (soft-tissue, bone and dentoalveolar injury).

The patients also reported the cause of the maxillofacial injury as violence, traffic or sports accident, an injury which occurred during recreation activities or work accident.

Data were imported into statistical program SPSS 19.0 (SPSS, Chicago, IL, USA). To estimate the difference in types and causes of the maxillofacial injuries according to the different age and gender parameters, the  $x^2$  test was used.

### Results

A total of 64 patients with different types of maxillofacial trauma were treated at Department of Maxillofacial Surgery, University Hospital Center Osijek between January 2011 and December 2013.

There were 41 males (64.1%) and 23 females (35.9%), giving a male to female ratio of 2.78:1.

Distribucija pacijenata s obzirom na spol i uzrok ozljeđivanja prikazana je na slici 1. Najčešći uzrok ozljeđivanja u oba spola bio je pad (39 % muškarci; 65 % žene). Drugi po redu uzrok ozljeđivanja kod muškaraca bila je tučnjava (29 %), a slijede sportske ozljede (12 %) i one nastale tijekom rekreacije (10 %). Isti broj pacijenata prijavio je ozljede u prometnoj nezgodi te na radu (5 % pojedinačno) (slika 1.). U ženskoj skupini drugi po redu uzrok ozljeđivanja bila je prometna nezgoda (26 %), a zatim tučnjava te sportske ozljede (4 % pojedinačno). Ni jedna pacijentica nije prijavila ozljedu nastalu tijekom rekreacije ili rada (slika 1.). Razlika u uzroku ozljeđivanja između muškaraca i žena bila je statistički značajna ( $X^2 = 16,22$ ;  $ss = 5$ ;  $p = 0,006$ ).

Distribucija pacijenata s obzirom na spol i vrstu ozljede prikazana je na slici 2. Najčešća vrsta ozljede u oba spola bila je koštana (51 % muškarci; 52 % žene). Kod muškaraca najčešće je zabilježena fraktura zigomatične kosti (55 %), zatim donje čeljusti – 20 posto i gornje čeljusti – 17 posto. Kod žena je najčešći bio prijelom donje čeljusti – 40 %, zatim zigomatične kosti – 36 % i maksile – 7 %. Sljedeća najčešća vrsta ozljede kod muškaraca bila je mekotkivna ozljeda (24 %), zatim mekotkivno-koštana ozljeda (17 %), kombinirana (5 %) i mekotkivno-dento-alveolarna ozljeda (3 %) (slika 2.). Kod žena je druga po redu vrsta ozljede također bila mekotkivna (30 %), a slijede mekotkivno-dento-alveolarna (9 %), te mekotkivno-koštana i kombinirana (4,5 % pojedinačno) (slika 2.). Nije pronađena razlika u vrsti ozljede s obzirom na spol pacijenata ( $p > 0,05$ ).

Pacijenti u ovom istraživanju bili su u dobi od 18 do 86 godina. Oni do 28 godina svrstani su u prvu dobnu skupinu (21; 33 %), od 28 do 50 u drugu (20; 31 %), a stariji od 50 godina u treću (23; 36 %).

Distribucija pacijenata s obzirom na dobne skupine i uzroke ozljeđivanja prikazana je na slici 3. Najčešći uzrok ozljeđivanja najmlađih pacijenata bila je tučnjava (43 %), zatim pad (24 %) te ozljede nastale tijekom rekreacije, u prometu i na radu (10 % pojedinačno) (slika 3.). Samo tri posto najmlađih pacijenata ozlijedilo se na sportskim aktivnostima (slika 3.). U srednjoj dobnoj skupini najčešći uzrok ozljeđivanja bio je pad (50 %), zatim tučnjava, prometne i sportske nezgode (15 % pojedinačno) te rekreacija (5 %). Nitko od pacijenata iz ove skupine nije naveo da se ozlijedio na radu (slika 3.). U najstarijoj dobnoj skupini najčešći je uzrok ozljeđivanja ponovno bio pad (70 %), zatim slijede prometne (13 %) i sportske nezgode (9 %) te tučnjava i rekreacija (4 % pojedinačno). U ovoj dobnoj skupini pacijenti također nisu prijavili ozljede nastale na radu (slika 3.). Razlika u uzrocima ozljeđivanja, ovisno o dobnim skupinama pacijenata, bila je statistički značajna ( $X^2 = 19,23$ ;  $ss = 10$ ;  $p = 0,037$ ).

Distribucija pacijenata s obzirom na dobne skupine i vrstu ozljede nalazi se na slici 4.

Najčešća ozljeda u svim dobnim skupinama bila je koštana (48 % prva; 50 % druga; 57 % treća dobna skupina). Sljedeća vrsta ozljede u svim dobnim skupinama bila je mekotkivna (29 % prva; 25 % druga; 26 % treća dobna skupina), zatim mekotkivna i koštana ozljeda (14 % prva; 10 % druga; 13 % treća dobna skupina). Manje od pet posto ozljeda bile su mekotkivno-dento-alveolarne ili kombinirane (5 % po-

Distribution of patients according to gender and causes of injuries is shown in Figure 1. The most common reported cause of injuries in both gender groups was falling down (39% males; 65% females). The second leading cause of injuries in males was interpersonal violence (29%), followed by sports accidents (12%) and recreation (10%). The same percent of patients reported the injuries were caused in traffic or at work (5% respectively) (Figure 1). In female group the second leading cause of injuries was traffic accident (26%), followed by violence and sports accidents (4% respectively). None of the female patients reported their injuries were caused in recreation or at work (Figure 1). The gender difference in injury causes was found to be statistically significant ( $X^2=16.22$ ;  $df=5$ ;  $p=0.006$ ).

Distribution of patients according to gender and types of injuries is shown in Figure 2. The most common reported type of injury in both gender groups was bone injury (51% males; 52% females). In males the most frequent fracture was zygomatic bones 55%, followed by mandible 20% and maxilla 17%. In females the most frequent fracture was mandible 40%, followed by zygomatic bones 36% and maxilla 7%. The second leading cause of injuries in males was soft-tissue injury (24%), followed by soft-tissue and bone injury (17%) combined injury (5%) and soft-tissue and dentoalveolar injury (3%) (Figure 2).

The second leading type of injuries in females was soft-tissue injury (30%), followed by soft-tissue and dentoalveolar injury (9%), and soft-tissue and bone injury as well as combined injury (4,5% respectively) (Figure 2). The gender difference in types of injuries was not statistically significant ( $p>0.05$ ).

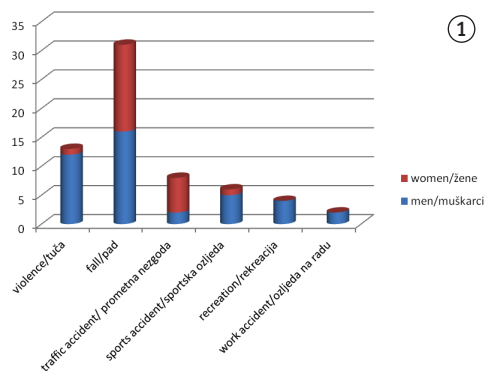
The patients in this study were 18 to 86 years old. The patients up to 28 years old were considered the first age group (21; 33%), from 28 to 50 the second (20; 31%) and more than 50 years old the third age group (23; 36%).

Distribution of patients according to the age group and causes of injuries is shown in Figure 3.

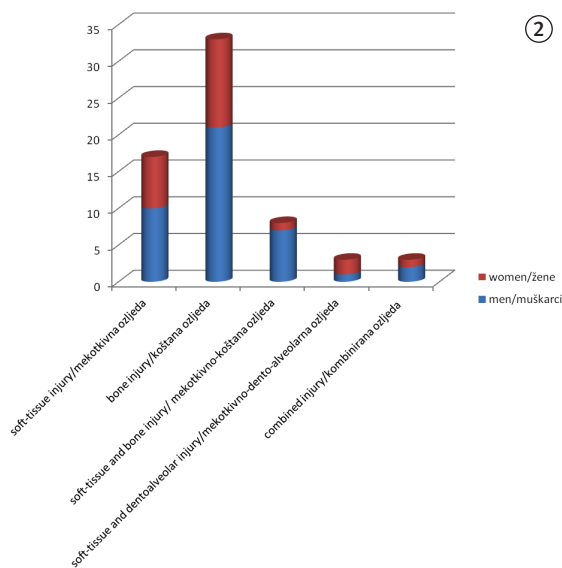
The most common causes of injuries in the youngest patients were violence (43%), followed by fall (24%) and recreation, traffic and work accidents (10% respectively) (Figure 3). Only 3% of the youngest patients reported the injuries caused by sports activity (Figure 3). In the middle-aged group the most common cause of injuries was falling down (50%), followed by violence, traffic and sports accidents (15% respectively) and recreation (5%). None of the patients in the middle-aged group reported injuries caused at work (Figure 3). In the oldest age group, the most common cause of injuries was falling down (70%), followed by traffic (13%) and sports accidents (9%) and violence and recreation (4% respectively). In this age group, none of the patients reported the injuries caused at work as well (Figure 3). The age difference in injury causes was found statistically significant ( $X^2=19.23$ ;  $df=10$ ;  $p=0.037$ ).

Distribution of patients according to the age group and types of injuries is shown in Figure 4.

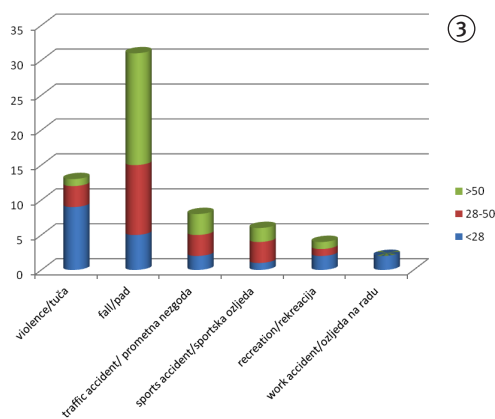
The most common reported type of injury in all age groups was bone injury (48% first; 50% second; 57% third age group). The second leading cause of injuries in all age



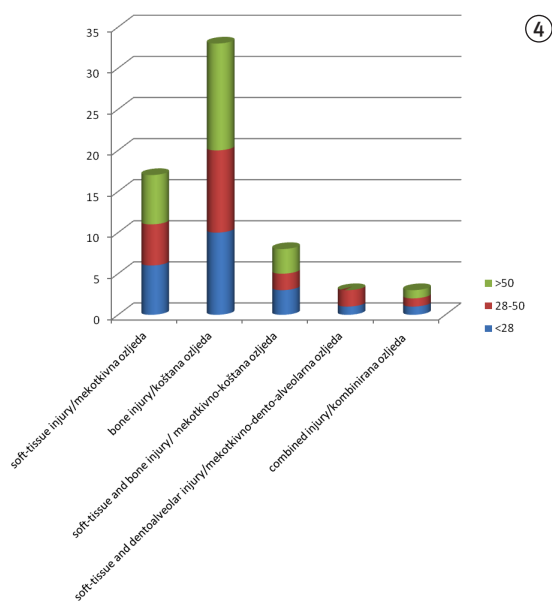
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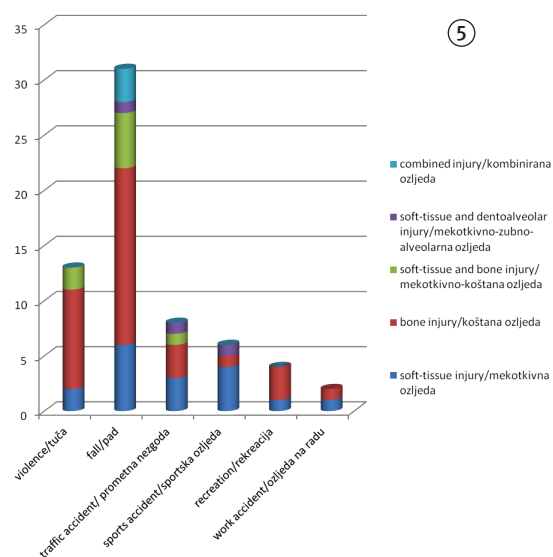
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Slika 1. Distribucija pacijenata s obzirom na spol i uzrok ozljede  
 Figure 1 Distribution of patients according to gender and causes of injuries  
 Slika 2. Distribucija pacijenata s obzirom na spol i vrstu ozljede  
 Figure 2 Distribution of patients according to gender and types of injuries  
 Slika 3. Distribucija pacijenata s obzirom na dobne skupine i uzrok ozljede  
 Figure 3 Distribution of patients according to age group and causes of injuries  
 Slika 4. Distribucija pacijenata s obzirom na dobne skupine i vrstu ozljede  
 Figure 4 Distribution of patients according to age groups and types of injuries  
 Slika 5. Distribucija različitih vrsta ozljeda s obzirom na uzroke ozljeđivanja  
 Figure 5 Distribution of different types of injuries according to the causes

jedinačno) (slika 4.). Nije pronađena razlika u vrsti ozljede s obzirom na dob pacijenata ( $p > 0,05$ ).

Rezultati ovog istraživanja također su pokazali da su koštane ozljede najčešće uzrokovane tučnjavom, padovima te bavljenjem rekreacijom (50 – 70 %), a mekotkivne najčešće nastaju u prometnim nezgodama i tijekom sportskih aktivnosti te na radu (37 – 66 %) (slika 5.) ( $p > 0,05$ ).

Većina padova i ozljeda nastalih u tučnjavi uzrokovali su koštane ozljede, a ozljede mekih i dento-alveolarnih tkiva bile su uzrokovane prometnim nezgodama i bavljenjem sportom (slika 5.;  $p > 0,05$ ).

## Rasprava

U različitim dijelovima svijeta velike su varijacije u epidemiologiji maksilofacijalnih ozljeda, a one su ponekad vidljive i unutar jedne države (8, 21, 22).

Rezultati ovog istraživanja pokazuju da su maksilofacijalne ozljede češće kod muškaraca, s omjerom muškaraca i žena od 2,78 : 1.

Čini se da ovaj omjer varira u raznim područjima – od 1,3 : 1 oko Pescare u Italiji, 2 : 1 u Austriji, 2,8 : 1 u Turskoj i Japanu, pa sve do 4,6 : 1 u južnoj Bugarskoj te zemljama Bliskog istoka (6, 10, 13, 18, 23, 24). Razlog za tako visok omjer muškaraca i žena s maksilofacijalnim ozljedama u nekim dijelovima svijeta nije samo u segregaciji žena iz društvenih zbivanja u istočnim dijelovima, nego i u broju muških vozača, njihovu prakticanju ekstremnijih sportova te češćoj konzumaciji alkohola i drugih droga (18).

Spolna distribucija maksilofacijalnih ozljeda u ovom istraživanju sličnija je onoj urbanih europskih zemalja, s pojačanom ženskom participacijom u aktivnostima koje su prije bile rezervirane za muškarce (25).

Rezultati koji se odnose na uzroke maksilofacijalnih ozljeda vrlo su različiti. U većini studija ističu se prometne nezgode kao najčešći razlog za maksilofacijalne traume, a na drugom mjestu su tučnjave i padovi (10, 17, 23, 26). Čini se kako problem s prometnim nezgodama postoji i u razvijenim i nerazvijenim državama, ali se drukčije interpretira.

U nerazvijenim zemljama na pojavnost maksilofacijalnih ozljeda očito utječu nedostatak prometne regulacije i loša cestovna infrastruktura te stara vozila bez zaštitne opreme (27, 28). Ramalingam je objavio da je u Indiji, u trogodišnjem razdoblju, više od 70 posto pacijenata s maksilofacijalnom traumom ozlijeđeno u prometu (27). S druge pak strane, i u nekim razvijenim zemljama glavni je uzrok maksilofacijalnih ozljeda isti (8, 23, 29). Ovaj rezultat može se pripisati prekoračenjima brzine zbog vrlo brzih i modernih automobila, nekorištenja sigurnosnih pojaseva i zaštitnih kaciga te konzumaciji alkohola i ostalih intoksicirajućih agensa (26). U tim se zemljama vrlo često upotrebljavaju prijevozna sredstva na dva kotača, što pridonosi ozljedama jer su bicikli i motori ondje vrlo popularni (23).

Također je zanimljivo spomenuti da se u razvijenim zemljama broj žena ozlijeđenih u prometnim nezgodama stalno povećava, što dokazuje da su uključene u socijalni život poput muškaraca (23).

Još uvijek je u određenom broju studija tučnjava glavni uzrok maksilofacijalnih ozljeda. U Arslanovu istraživanju u

groups was soft-tissue injury (29% first; 25% second; 26% third age group), followed by soft-tissue and bone injury (14% first; 10% second; 13% third age group). Less than 5% of the injuries were soft-tissue and dentoalveolar injury or combined (5% respectively) (Figure 4). The age difference in types of injuries was not statistically significant ( $p > 0,05$ ).

The majority of the falls and violence caused bone tissue injuries, and soft tissue and dentalveolar injuries were detected in traffic and sports accidents (Figure 5;  $p > 0,05$ ).

## Discussion

There are great variations in epidemiological features of maxillofacial injuries among population of different regions of the world, and sometimes even within the same country (8, 21, 22).

The results of this study showed that maxillofacial injuries are more common in males, with a male to female ratio of 2.78:1. This ratio seems to vary in different regions, from 1.3:1 in province of Pescara in Italy, 2:1 in Austria, 2.8:1 in Turkey and Japan, up to 4.6:1 in Southern Bulgaria and Middle East countries (6, 10, 13, 18, 23, 24). The reason for the high male to female ratio in some regions of the world may be not only the segregation of women from social life in eastern countries, but also the great number of male vehicle drivers, their practice of more physical contact sports and higher consumption of alcohol and other drugs (18).

Our gender distribution of maxillofacial injuries is more similar to urbanized European countries with the increasing female participation in activities that were previously male dominant (25).

The results concerning causes of maxillofacial injuries generally differ. The majority of the studies prove traffic accidents to be the primary cause of the maxillofacial trauma, followed by interpersonal violence and falls (10, 17, 23, 26). It seems that the problem with road accidents exists in both developed and undeveloped countries, but is interpreted differently.

In undeveloped countries it is obvious that the lack of traffic regulations as well as poor road infrastructure and old vehicles without safety features influence the prevalence of maxillofacial injuries (27, 28). Ramalingam reported even more than 70% of the patients with maxillofacial trauma were injured in road traffic accidents in India in three years (27). On the other hand, in some developed European countries the leading cause of maxillofacial injuries is the same (8, 23, 29). This can be attributed to the violation of speed limits due to the very fast modern vehicles, failure to wear seat belts and helmets and consumption of alcohol or other intoxicating agents (26). In these countries there is also a high increase in two wheelers responsible for the injuries because in urban cities the bicycles and motorcycles are very popular as means of transport (23). It is also interesting that in the developed countries the number of females injured in road traffic accidents is still increasing thus proving that they are involved in social life equally as men (23).

40 posto slučajeva tučnjava je bila glavni uzrok ozljede (18). Lee i suradnici potvrdili su gotovo jednak postotak, no u Bakardjievov studiji postotak uzroka bio je 61 posto (12,13). Također je važno istaknuti da su u svim istraživanjima u kojima je glavni uzrok maksilofacijalne ozljede bila tučnjava, sudjelovali mladi pacijenti (12, 13, 18).

Pad se obično spominje kao drugi ili treći uzrok maksilofacijalnih ozljeda, s pojavnošću od 20 do 30 posto i to uglavnom kod starijih pacijenata (18, 23, 26).

Rezultati ovog istraživanja pokazali su da je pad najčešći uzrok svih maksilofacijalnih ozljeda i kod muškaraca i kod žena, kod muškaraca je na drugom mjestu tučnjava, a kod žena prometna nezgoda (slika 1.) ( $p < 0,05$ ). Ovi se rezultati podudaraju s ostalim studijama i dokazuju da su muškarci češće uključeni u nasilje od žena.

S obzirom na dob pacijenata u ovom istraživanju, u najmlađoj dobnoj skupini (do 28 godina) glavni je uzrok ozljeda bila tučnjava (12 %), a kod onih starijih od 28 to je bio pad (25 %). Ovi rezultati slažu se s rezultatima ostalih studija (slika 3;  $p < 0,05$ ). Prosječna dob u ovom istraživanju iznosila je 42 godine (60 % ispitanika bilo je starije od 28 godina), pa ovaj uzorak nije bio tako mlad kao u nekim istraživanjima, a imali smo i nekoliko pacijenata starijih od 80 godina tako da smo i očekivali pad kao najčešći uzrok ozljeđivanja.

Zato odbacujemo početnu hipotezu o nepostojanju razlike u vrsti i uzrocima maksilofacijalnih ozljeda, ovisno o spolu i dobi pacijenata.

Promatrajući kliničke aspekte maksilofacijalne traume, u većini studija navodi se visoka stopa koštanih ozljeda (većinom mandibule i zigomatične kosti), što je očito povezano s prominentnim položajem navedenih anatomskih struktura i činjenicom da te kosti nisu zaštićene jer vozači automobila ne nose kacigu, a vezivanje sigurnosnim pojasom ne štiti uvijek od ozljeda glave. U većini padova pacijenti automatski zaštićuju ostale dijelove tijela umjesto glave. Čini se također da je uzrok maksilofacijalne traume povezan s vrstom ozljede.

Arslan i suradnici pronašli su u svojem istraživanju 56 posto koštanih fraktura i to većinom maksile (30 %) tijekom tučnjave (40 %) te smatraju da se tijekom borbe najčešće događa srednji dio lica (18).

Ascani i suradnici pronašli su frakture mandibule u 31 posto slučajeva te zigomatične kosti u 22 posto, a kao glavni uzrok ozljeđivanja naveli su prometne nezgode u kojima su vozila na dva kotača bila uzrok ozljeđivanja u 73 posto slučajeva (23).

Gotovo je podjednak postotak fraktura mandibule i zigomatične kosti u Eidtovu istraživanju, s prometnim nezgodama kao glavnim uzrokom ozljeda, ali on je istodobno istaknuo i 16 posto mekotkivnih i 2,6 posto dento-alveolarnih ozljeda (26). Gassner i suradnici izvijestili su o velikom postotku mekotkivnih ozljeda (62,5 %) i 50 posto dento-alveolarnih ozljeda nastalih tijekom svakodnevnih i sportskih aktivnosti (6). I u Ramlijevu istraživanju najčešća ozljeda bila je ona mekih tkiva (30).

U našem istraživanju najčešća ozljeda u oba spola bila je koštana ozljeda zigomatične kosti (55 %), zatim mandibule (20 %) i maksile (17 %) (slike 2. i 5.;  $p > 0,05$ ). Uzimajući u obzir kao glavni uzrok ozljeđivanja pad, prosječnu dob u

There are still a great number of studies revealing the interpersonal violence as a major cause of maxillofacial injuries. In Arslan's study the most common cause of the maxillofacial trauma was violence, accounting for 40% of the sample (18). Lee et al. reported almost the same percentage, but in Bakardjiev's study it was 61% of the sample (12, 13). It is also important to mention that in all studies where the leading cause of the maxillofacial injuries was some kind of violence mostly young men were involved (12, 13, 18).

Falling down was usually mentioned as the second or the third cause of oro-maxillofacial injuries, amounting to 20-30% and mostly in elderly patients (18, 23, 26).

The results of this study revealed fall as a major cause of all oro-maxillofacial injuries in men and in women, but violence as the second one in men and traffic accident as the second one in women (Figure 1) ( $p < 0,05$ ). This finding is in accordance with the results of other studies proving that men suffer more violence than women.

Regarding the age of the patients in this study, in the youngest group (up to 28 years old) the leading cause of injuries was violence (12%), but in those older than 28 it was fall (25%), and the results comply with those from other studies (Figure 3;  $p < 0,05$ ). The mean age in our study was 42 (60% of them were older than 28) and the patients were not as young as in some studies. We also had some patients older than 80 years and it was expected that their main cause of injuries was fall.

Therefore, our null hypothesis concerning no difference in types and causes of oro-maxillofacial injuries in different age and gender groups of patients was rejected.

Considering the clinical aspects of oro-maxillofacial trauma, the high rate of bone injuries (mainly mandible and zygomatic bones) in majority of the studies is obviously related to the most prominent position of these anatomical structures as well as the fact that these bones are mainly unprotected because the automobile drivers do not wear helmets and there is a great number of accidental falls where the patients react automatically protecting other parts of the body instead of the head. It also seems that the cause of the oro-maxillofacial trauma is correlated with the type of the injury.

Arslan et al. found 56% of bone fractures in his study and most of them were maxillary bone fractures (30%) caused by violence (40%) assuming that the mid-facial part is the most affected region while fighting (18).

Ascani et al. reported mandible fractures in 31% and zygomatic bone fractures in 22% with the most common cause of the maxillofacial fractures in their study being road traffic accidents, and among them two wheelers participated in 73% (23).

Almost the same percentage of mandible and zygomatic bone fractures were reported in Eid's study with car accidents as the main cause of injuries, but he also reported 16% of soft-tissue as well as 2.6% dentoalveolar injuries (26). Gassner et al. also reported a great amount of soft-tissue injuries (62.5%) and 50% of dentoalveolar injuries originating from daily life and sports activities (69%) (6). In Ramli's study the most common injury was soft-tissue injury too (30).

In our study the most common injury in men and in women was bone injury (zygomatic bones 55%, followed by

ovom istraživanju od 42 godine te da su nam u 15 posto slučajeva pacijenti bili stariji od 65 godina, ovaj rezultat možemo pripisati činjenici da je zigomatična kost najčešće frakturirala zato što je najekspoziranija kost glave i prva je tijekom pada u kontaktu s podlogom. Sljedeća vrsta traume u ovom istraživanju, u oba spola, bila je mekotkivna ozljeda (24 – 30 %) (slika 2.;  $p > 0,05$ ). Žene su češće imale mekotkivno dento-alveolarne ozljede, a muškarci mekotkivne i koštane ozljede (slika 2.;  $p > 0,05$ ).

Treba također spomenuti još jedan vrlo važan čimbenik za pojavnost maksilofacijalnih trauma. U Ascanijevu istraživanju gotovo je 40 posto pacijenata priznalo da su bili pod utjecajem alkohola u vrijeme ozljeđivanja i ti se rezultati slažu s onima u ostalim studijama (10, 23, 31 – 33). U našem istraživanju nitko od pacijenata nije izjavio da je bio pod utjecajem alkohola, no mi mislimo da to nije točno. Naime, vjerojatno su se sramili priznati jer smo u skupini pacijenata srednje dobi (od 28 do 50 godina) otkrili da je pad najčešći uzrok njihova ozljeđivanja, a oni još nisu bili dovoljno stari za neuromuskularne i degenerativne probleme koji bi utjecali na koordinaciju pri hodanju.

Ograničenje ovog istraživanja očituje se u malom uzroku koji u budućim studijama treba povećati te s moraju uključiti i podatci o terapiji ozljeđenih pacijenata.

## Zaključak

Na temelju rezultata ovog istraživanja možemo zaključiti da je pad bio najčešći uzrok maksilofacijalnih ozljeda i kod muškaraca i kod žena te u sve tri dobne skupine. Najčešća vrsta ozljede bila je koštana, i to uglavnom zigomatične kosti. Preventivne mjere, poput poštovanja zakona o konzumaciji alkoholnih pića te obvezno nošenje kacige i zaštitnog pojasa, mogle bi smanjiti broj maksilofacijalnih ozljeda.

## Sukob interesa

Nije ga bilo.

mandible 20% and maxilla 17%) (Figures 2 and 5;  $p > 0.05$ ). Taking into account that the leading cause of these injuries was falling down, that the mean age in this study was 42 and that we had 15% of them older than 65, we can attribute this finding to the fact that zygomatic bone is usually fractured due to its most exposed head position and first one in contact with the floor during the fall. The next type of trauma in this study in men and women was soft-tissue (24-30%) (Figure 2;  $p > 0.05$ ). Women also had more soft-tissue and dento-alveolar injuries and men more soft and bone tissue injuries (Figure 2;  $p > 0.05$ ).

There is also one very important factor influencing the incidence of maxillofacial trauma. In the study by Ascani et al., almost 40% of the patients reported they had been under the effect of alcohol at the time of injury and these results are in accordance with some other studies (10, 23, 31-33). In our study, none of the patients reported alcohol consuming and we think this was not true. They were probably ashamed to admit it because the middle-age group in the study (from 28 to 50 years old) revealed fall as the major cause of the injuries and they were still not old enough to have neuromuscular and degenerative problems affecting their walking coordination.

The limitation of this study is the small sample which has to be increased as well as to include data about the therapy of different types of the oro-maxillofacial injuries in further studies.

## Conclusion

According to the results of this paper, we can conclude that falling down was the most common cause of oro-maxillofacial injuries in both men and women and in all three age groups. The leading types of injuries were bone injuries, mostly zygomatic bones. Preventive measures, such as enforcement of the law regarding drinking as well as the obligatory wearing of a helmet and seat belts may reduce the number of maxillofacial injuries.

## Conflict of interest

None declared

### Abstract

**Objectives:** The occurrence and causes of maxillofacial trauma varies in different regions of the world. The aim of this study was to identify the occurrence, types and causes of maxillofacial injuries according to the age and gender differences in patients treated at the Department of Maxillofacial Surgery, University Hospital Center Osijek, between January 2011 and December 2013. **Materials and methods:** A total of 64 patients, 41 males (64.1%) and 23 females (35.9%), aged from 18 to 86 years (mean age 42) participated in the study. Data collected and analyzed included gender, age, cause of injury and the type of maxillofacial injuries. **Results:** The most common cause of injuries in both gender groups was falling down (39% males; 65% females). The second leading cause of injuries in males was interpersonal violence (29%) and in females traffic accident (26%) ( $p < 0.05$ ). The most common type of injury in both gender groups was bone injury (50%; in males zygomatic bones 55%, in females mandible 40%) ( $p > 0.05$ ). The most common causes of injuries in the youngest patients was violence (43%), and in others fall (50-70%;  $p < 0.05$ ). The most common reported type of injury in all age groups was bone injury (more than 50%;  $p > 0.05$ ). The majority of the falls and violence caused bone tissue injuries, and soft tissue and dentalveolar injuries were detected in traffic and sports accidents ( $p > 0.05$ ). **Conclusion:** Falling down was the most common cause of oro-maxillofacial injuries in both men and women and in all three age groups. The leading type of injury was bone injury. The data obtained from this study provide important information for future prevention from injuries.

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### Key words

Wounds and Injuries; Maxillofacial Injuries; Soft Tissue Injuries; Bone and Bones

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