Vildana Džemidžić, Alisa Tiro, Lejla Redžepagić-Vražalica, Enita Nakaš

Potreba za ortodontskom terapijom kod učenika u dobi između 12 i 14 godina u Bosni i Hercegovini

The Need for Orthodontic Treatment Among 12 - 14 Years Old Bosnian Schoolchildren

Zavod za ortodonciju Stomatološkog fakulteta Sveučilišta u Sarajevu
Department of Orthodontics School of Dental Medicine University of Sarajevo

Sažetak

Svrha: Ovim se istraživanjem željelo odrediti je li potrebno ortodontsko liječenje školske djece u Bosni i to na uzorku dječaka i djevojčica u dobi između 12 i 14 godina, a rabila se IOTN-ova komponenta dentalnoga zdravlja (Dental Health Componenta – DHC) i estetska komponenta (Aesthetic Componenta – AC). Nastojali su se odrediti i mogući povezni čimbenici. **Metode:** Pregledano je 295 učenika (152 dječaka i 143 djevojčice) iz četiriju osnovnih škola u Sarajevu koji nisu bili podvrgnuti ortodontskoj terapiji. To je učinio jedan ispitivač koji je prije toga dobio upute iz Indeksa potrebe za ortodontsku terapiju. **Rezultati:** Prema DHC-u ustanovljeno je da 53,6 posto ispitanika treba ortodontsku terapiju, a pronađena je i statistički značajna razlika među spolovima. Potreba za ortodontskom terapijom prema AC-u pronađena je samo kod 3,7 posto sudionika i nije ustanovljena statistički značajna razlika među spolovima. **Zaključci:** Rezultati ovog istraživanja daju osnovu za podatke o nužnoj ortodontskoj terapiji kod djece iz Bosne u dobi između 12 i 14 godina te mogu pomoći u planiranju, određivanju prioriteta i raspodjeli resursa dentalne zdravstvene zaštite. Budući da je potreba za ortodontskom terapijom među djecom u Bosni – ustanovljena prema IOTN-u – vrlo visoka i rezultat je lošeg oralnog zdravlja, prijeko su potrebne preventivne mjere.

Uvod

Razvijeno je nekoliko indeksa za procjenu je li potrebna ortodontska terapija u pojedinim populacijama i zajednicama, zatim kako se odabiru pacijenti koji se mogu liječiti na određeni način i postavljaju prioriteti kad je riječ o ograničenim financijama. Jedan od najčešćih je Indeks potreba za ontodontskom terapijom – Index of Orthodontic Treatment Need (IOTN) koji su opisali Brook i Shaw 1989. godine (1). Sastoji od dvaju dijelova – komponente zdravlja zuba (DHC) i estetske komponente (AC) kojima se istraživači mogu koristiti za procjenu zdravlja zuba i ustanoviti estetski nedostatak zbog malokluzije. Komponenta DHC-a uključuje različite okluzalne osobine za koje se smatra da povećavaju morbiditet zuba. One su podijeljene u pet stupnjeva. Estetska komponenta (AC) sastoji se od 10 stupnjevanih fotografija u boji na kojima su različiti stupnjevi privlačnosti zuba. Indeks potreba za ortodontskom terapijom (IOTN) razvijen je s namjerom da se identificiraju pojedinci koji bi najvjerojatnije imali korist od ortodontske terapije (2). U mnogim zemljama nedavno su bila provedena istraživanja o korištenju IOTN-indeksa, primjerice u Ujedinjenom Kraljevstvu (*Burden i Holmes*, 1994. i *Cheestnutt sa suradnicima,* 2006.) (3, 4), Turskoj (*Üçüncü* i *Ertugaj,* 2001.)(5),

Introduction

Several indices have been developed to assess orthodontic treatment need in particular populations or communities, to select the patients who can be treated in a certain dental care system and to establish priorities when resources are limited. One of the most widely applied indices for assessment orthodontic treatment need is the Index of Orthodontic Treatment Need (IOTN), described by *Brook* and *Shaw* (1989), (1). This index consists of two separate components – Dental Health Component (DHC) and Aesthetic Component (AC), which can be used for assessing dental health as well as aesthetic impairment due to malocclusion. A Dental Health Component (DHC) incorporates various occlusal traits considered to increase the morbidity of dentition, ranged in 5 grades. The Aesthetic Component (AC) consists of a scale of 10 color photographs showing different levels of dental attractiveness. The Index of Orthodontic Treatment Need (IOTN) has been developed with the intention of identifying those individuals who would most likely benefit from orthodontic treatment (2). Recent investigations have been carried out using the IOTN in many countries such as the United Kingdom (*Burden and Holmes*, 1994. and *Cheestnutt et al.,* 2006.), (3,4),

Jordanu (*Abu Alhajia i njegovi kolege,* 2004.)(6), Francuskoj (*Souames i suradnici,* 2006.)(7), Italiji (*Nobile i njegov tim,* 2007.)(8), Švedskoj (*Josefsson,* 2007.)(9), Španjolskoj (*Manzanera i suradnici,* 2009.)(10) i Brazilu (*Dias,* 2009.),(11).

Svrha ovog istraživanja bila je procijeniti je li potrebna ortodontska terapija kod učenika u dobi između 12 i 14 godina u Bosni korištenjem IOTN-indeksa te je li moguće odrediti čimbenike koji na to utječu.

Ispitanici i postupci

Ispitanici

U ovom istraživanju sudjelovalo je 295 učenika (152 dječaka i 143 djevojčice) u dobi između 12 i 14 godina iz četiriju osnovnih škola u Sarajevu (tablica 1). Svi koji su ranije bili na ortodontskoj terapiji ili u trenutku kada su se birali sudionici, isključeni su iz istraživanja.

Turkey (*Üçüncü* and *Ertugaj,* 2001.), (5), Jordan (*Abu Alhajia et al.*, 2004.), (6), French (*Souames et al.,* 2006.), (7), Italy (*Nobile et al.*, 2007.), (8), Sweden (*Josefsson,* 2007.), (9), Spain (*Manzanera et al.*, 2009.), (10), Brazil (*Dias,* 2009.9, (11).

The aim of this study was to assess the orthodontic treatment need among Bosnian schoolchildren aged 12 – 14 years using IOTN index as well as to determine the possible factors associated with this necessity.

Material and Methods

Subjects

This study involved 295 (143 girls and 152 boys) subjects aged between 12 – 14 years, from four primary schools in Sarajevo (Table 1). Subjects who were undergoing or had previously received orthodontic treatment were not included in this study.

Tablica 1. Raspodjela uzorka prema godinama i spolu **Table 1** Age and gender distribution of the sample	**Spol • Gender**	**n**	**%**	**Srednja dob • Mean age**
	Dječaci • Boys	152	51.5	13.15
	Djevojčice • Girls	143	48.5	13.2
	Ukupno • Total	295	100.0	13.17

Metode

Klinički pregled obavljen je u učionicama, pod dnevnim svjetlom. Učinjen je usnim zrcalom i pomičnom mjerkom, bez uporabe rentgena i studijskih modela. Obavio ga je jedan ispitivač koji je prije dobio upute o korištenju IOTN-a. IOTN se, naime, sastoji od dvaju dijelova – komponente zdravlja zuba (DHC) i estetske komponente (AC) i na taj je način kod svih ispitanika procijenjena okluzija. Komponenta zdravlja zuba (DHC) ima pet kategorija/stupnjeva: 1. i 2. stupanj znači da *nema potrebe ili je mala potreba za ortodontskom terapijom*; 3. stupanj oznaka je za *graničnu potrebu za terapijom*, a 4. i 5. stupnjem označava se *velika potreba za ortodontskom terapijom*. U sklopu svake kategorije su i različite okluzalne značajke, ovisno o njihovoj težini – zagriz, pregriz, otvoreni zagriz, križni zagriz (prednji ili bočni), nepravilno postavljeni zubi i otežano nicanje zuba, II. i III. klasa okluzije, rascjepi usne i/ili nepca te hipodoncija. Estetska komponenta (AC) sastoji se od 10 fotografija u boji, a prikazuju različite stupnjeve privlačnosti zuba. Tako prva predstavlja najprivlačniji, a deseta najmanje privlačni stupanj. Vrjedovanje slika ocijenjenih stupnjevima od 1 do 4 znači da *nema potrebe/mala je potreba za ortodontskom terapijom*, stupnjevi od 5 do 7 pokazuju *graničnu potrebu za terapijom*, a od 8 do 10 *veliku potrebu za ortodontskom terapijom,* kad je riječ o estetici.

Methods

Clinical examinations of subjects were performed at the school classrooms, under daylighting conditions. A mouth mirror and sliding caliper were used, without radiographs or study casts. The examination was carried out by one examiner who had been previously trained and calibrated in the use of the IOTN.

IOTN has two parts – Dental Health Component (DHC) and Aesthetic Component (AC), and each subject's occlusion was assessed using both components.

Dental Health Component (DHC) falls into five categories - grades: Grade 1 and Grade 2 represent 'no/little need for orthodontic treatment', Grade 3 'borderline need for treatment' and Grade 4 and Grade 5 'severe/great need for treatment'. Within each category the different occlusal traits are included according to their severity – overjet, overbite, open bite, crossbite (anterior or posterior), displacement of teeth, and impeded eruption of teeth, Class II and Class III occlusion, clefts of lip and/or palate and hypodontia.

Aesthetic Component (AC) consists of a scale of ten color photographs showing different levels of dental attractiveness, with Grade 1 representing the most attractive and Grade 10 the least attractive dentitions. The validation panel judged Grades 1 – 4 represent 'no/little need for treatment', Grades 5 – 7 'borderline need for treatment' and Grades 8 – 10 represent 'great need for treatment' on aesthetic grounds.

Statistička analiza

Za statističku analizu rabio se Statistical Packages for Social Sciences (SPSS Inc., Chicago, Illinois, SAD), a stupanj statističke značajnosti bio je postavljen na 0,05.

Za test *intraispitivačko slaganje* 25 ispitanika je šest tjedana nakon inicijalnog pregleda ponovno ispitano. Određena je kappa-vrijednost za DHC od 0,76 i bila je dosta slična, a za AC-vrijednost od 0,73 postignuta je također velika podudarnost.

Statistical analyses

Statistical analyses were undertaken using the Statistical Packages for Social Sciences (SPSS Inc., Chicago, Illinois; USA). The significant level was set at 0.05.

To test intra-examiner agreement, 25 subjects were re-examined 6 weeks after their initial examination. Kappa value for the DHC was 0.76, representing substantial agreement; and for the AC was 0.73, representing substantial agreement.

Rezultati

Potreba za ortodontskom terapijom prema DHC-u prikazana je u tablici 2. U istraživanju se pokazalo da 99 ispitanika (33,6 %) gotovo da nije trebalo ortodontsku terapiju, 38 njih (12,9 %) imalo graničnu potrebu, a 158 učenika (53,6 %) trebalo ju je odmah. Ustanovljena je statistički značajna razlika između spolova prema DHC-stupnjevima IOTN-a (x^2 = 28,06; p < 0,05).

Results

Orthodontic treatment need according to Dental Health Component (DHC) is shown in Table 2. The study revealed that 99 subjects (33.6%) had no/little need for orthodontic treatment; 38 subjects (12.9%) had borderline need for orthodontic treatment and 158 subjects (53.6%) had severe/ great need for orthodontic treatment. There was a statistically significant difference between genders according to DHC grades of IOTN (x^2 = 28.06; p < 0.05).

Tablica 2. Raspodjela komponente zdravlja zubi prema spolu
Table 2 Distribution of the Dental Health Component of IOTN by gender

Kategorija • Category	Stupanj • Grade	Dječaci • Boys		Djevojčice • Girls		Ukupno • Total	
		n	%	n	%	n	%
Nema potrebe • No need	1	17	11.2	10	7.0	27	9.2
Mala potreba • Little need	2	39	25.7	33	23.1	72	24.4
Granična potreba • Borderline	3	23	15.1	15	10.5	38	12.9
Veća potreba • Severe need	4	60	39.4	80	55.9	140*	47.5
Velika potreba • Great need	5	13	8.6	5	3.5	18*	6.1
Total		152	100.0	143	100.0	295	100.0

* Razina statističke značajnosti x^2 = 28,06; p < 0,05 • Significance level x^2 = 28.06; p < 0.05

Raspodjela ocjena AC-a u sklopu IOTN-a nalazi se u tablici 3. Prema AC-komponenti IOTN-a 278 ispitanika (94,2 %) nije imalo ili je imalo malu potrebu za ortodontskom terapijom (AC stupnjevi od 1 do 4); 6 učenika (2 %) imalo je graničnu potrebu (AC stupnjevi od 5 do 7) i 11 njih (3,7 %) imalo je veliku potrebu za ortodontskom terapijom (AC stupnjevi od 8 do 10). Nije bilo statistički značajne razlike među spolovima prema AC-stupnjevanju u sklopu IOTN-a (x^2 = 4,21; p > 0,05). Tablica 4 prikazuje raspodjelu ispitanika u odnosu prema broju ekstrahiranih prvih trajnih molara.

The distribution of ratings for the Aesthetic Component (AC) of IOTN is shown in Table 3.

According to the Aesthetic Component (AC) of IOTN, 278 subjects (94.2%) had no/little need for orthodontic treatment (AC grade 1 – 4); 6 subjects (2.0%) had borderline need (AC grade 5 – 7) and 11 subjects (3.7%) had great need for orthodontic treatment (AC grade 8 – 10). There was no statistical difference between genders according to AC grades of IOTN (x^2 = 4.21; p > 0.05).

Table 4 shows the distribution of subjects considering the number of extracted first permanent molars.

Tablica 3. Raspodjela estetske komponente prema spolu
Table 3 Distribution of the Aesthetic Component of IOTN by gender

Kategorija • Category	Stupanj • Grade	Dječaci • Boys		Djevojčice • Girls		Ukupno • Total	
		n	%	n	%	n	%
Nema / mala potreba • No / Little Need	1	32	21.1	32	22.4	64	21.7
	2	54	35.5	45	31.5	99	33.6
	3	44	28.9	47	32.9	91	30.8
	4	13	8.6	11	7.7	24	8.1
Granična potreba • Borderline Need	5	1	0.7	0	0.0	1	0.3
	6	2	1.3	0	0.0	2	0.6
	7	2	1.3	1	0.7	3	1.0
Velika potreba • Great Need	8	4	2.6	6	4.2	10	3.4
	9	0	0.0	1	0.7	1	0.3
	10	0	0.0	0	0.0	0	0.0
Ukupno • Total		152	100	143	100	295	100

Razina statističke značajnosti x^2 = 4,21; p > 0,05 • Significance level x^2 = 4.21; p > 0.05

Tablica 4. Raspodjela izvađenih prvih trajnih kutnjaka prema spolu
Table 4 Distribution of extracted first permanent molars by gender

	Jedan molar • One molar		Dva molara • Two molars		Tri molara • Three molars		Četiri molara • Four molars		Ukupno • Total	
	n	%	n	%	n	%	n	%	n	%
Djevojčice • Girls	34	11.6	20	6.7	4	1.35	4	1.35	62	43.4
Dječaci • Boys	20	6.7	16	5.4	4	1.35	7	2.37	47	31.0
Ukupno • Total	54	18.3	36	12.2	8	2.7	11	3.7	109	36.9

Rasprava

Ovo istraživanje prvo je epidemiološko istraživanje malokluzije na temelju IOTN-a obavljeno u Bosni i Hercegovini. Sve češće korištenje tih indeksa diljem svijeta omogućuje usporedbu potreba za ortodontskom terapijom u Bosni i Hercegovini s drugim populacijskim skupinama. Ti podaci potrebni su i za praćenje prevalencije malokluzije i predlaganje preventivnih mjera.

Rezultati tih istraživanja pokazuju da 53,6 posto ispitanika objektivno treba ortodontsku terapiju prema DHC-u zbog IOTN-a. To je visok postotak u usporedbi s rezultatima ostalih istraživanja u kojima su se stručnjaci koristili IOTN-om za procjenu je li potrebna ortodontska terapija.

Burden i Holmes (1994.),(3) ustanovili su da 21 do 24 posto dvanaestogodišnjaka iz dvaju gradova u Velikoj Britaniji – Manchestera i Sheffielda – ima veliku potrebu za ortodontskom terapijom. Slične rezultate dobio je Souames (2006.) (7) u Francuskoj – 21,3 posto i Manzanera sa suradnicima (2009.),(10) u Španjolskoj – 21,8 posto.

Abu Alhaija i suradnici (2004.),(6) ustanovili su da u Jordanu 34 posto ispitanika između 12 i 14 godina ima veliku potrebu za ortodontskom terapijom; Dias (2009.), (11) ističe da u Brazilu 34,2 posto ispitanika ima veliku potrebu za ortodontskom terapijom; Chestnutt i njegovi kolege (2006.),(4) kažu da prema DHC-u ortodontsku terapiju treba 35 posto dvanaestogodišnjih ispitanika; Josefsson (2007.)(9) je ustanovio veliku potrebu za ortodontskom terapijom kod 37 posto ispitanika u Švedskoj; Üçüncü i Ertugay (2001.)(5), prema dobivenim rezultatima, kažu da u Turskoj veliku potrebu za ortodontskom terapijom ima 38 posto ispitanika u dobi između 11 i 14 godina.

Mogući razlog za tako veliku vrijednost potrebe za ortodontskom terapijom u našem istraživanju, prema DHC-komponenti, jest u velikom broju ispitanika koji su imali izgubljen jedan ili više trajnih zuba – obično prvi trajni kutnjak (tablica 4). Potreba za ortodontskom terapijom namijenjena je procjeni je li potrebna takva terapija djeci u ranoj trajnoj ozubljenosti, što znači dvanaestogodišnjacima s gubitkom jednog ili više trajnih zuba, a promjene koje se javljaju kao posljedica – stvaranje viška zuba, naginjanje susjednih zuba u to područje i zakretanje susjednih zuba, glavne su indikacije za terapiju. Oralno zdravlje građana Bosne i Hercegovine među najlošijima je u Europi, što je potvrđeno vrijednošću DMFT-indeksa. Godine 2003. njegova srednja vrijednost među dvanaestogodišnjom djecom u Sarajevu bila je 4,81 (12). Glavni razlozi za trenutačno stanje su nedostatak bilo kakvog preventivnog programa, zatim nema kurativno usmjerene dentalne politike, loš je socijalno-ekonomski

Discussion

The present study is the first epidemiological study of malocclusion using the IOTN in Bosnia and Herzegovina. Increasing international use of this index allows comparison of orthodontic treatment need in Bosnia and Herzegovina with other population groups. Also, these data are needed for monitoring the prevalence of malocclusion and development of preventive measures.

The results of this study showed that 53.6 % of subjects had an objective orthodontic treatment need according to the DHC of IOTN. This is a high value compared with results from other studies that have used the IOTN to assess orthodontic treatment needs.

Burden and Holmes (1994), (3) found that 21.0 - 24.0 % of twelve year-old subjects, in two cities, in the UK (Manchester and Sheffield) had great need for orthodontic treatment. Similar results were presented by Souames et al. (2006), (7) in France – 21.3 % and Manzanera et al. (2009), (10) in Spain – 21.8%.

Abu Alhaija et al. (2004)[6] found that 34.0 % of 12 – 14 year-old subjects in Jordan had great need for orthodontic treatment; Dias (2009), (11) found that 34.2 % of subjects in Brazil had a great need for orthodontic treatment; Chestnutt et al.(2006), (4) found that 35.0 % of twelve year-old subjects had a definite need for orthodontic treatment according to the DHC; Josefsson (2007), (9) found a great need for orthodontic treatment in 37.0 % of subjects in Sweden; Üçüncü and Ertugay (2001), (5) found that 38.8% of 11 – 14 year-old subjects had a definite need for orthodontic treatment in Turkey.

The reason for this high value of orthodontic treatment need in our study, according to the Dental Health Component (DHC), is that a large number of subjects had a loss of one or more permanent teeth, usually the first permanent molar (Table 4). The Index of Orthodontic Treatment Need is intended to assess orthodontic treatment need among children in early permanent dentition, which means in twelve year olds, and the loss of one or more permanent teeth, and changes that occur as a consequence of tooth loss – the formation of residual space and the inclination of adjacent teeth in this space, rotation of adjacent teeth, are the main indications for treatment.

The conditions of oral health in citizens of Bosnia and Herzegovina are among the worst in Europe, which is confirmed by value of DMFT index. The mean DMFT index for twelve year old children of Sarajevo in 2003 was 4.81(12). Main reasons for the present oral health situation are lack of any population preventive programs, curative-oriented den-

položaj stanovništva i promijenili su se uvjeti života tijekom rata i nakon njega (13). Visoka razina potrebe za ortodontskom terapijom među djecom u Bosni rezultat je loših preventivnih mjera. Slično našim rezultatima, Nobile i suradnici (2007.), (8) ustanovili su na uzorku od 546 ispitanika u dobi od 11 do 15 godina veliku potrebu za ortodontskom terapijom – čak njih 59,5 posto trebalo je intervenciju liječnika.

Za razliku od ispitivanja Üçüncüja i Ertugayja (2001.) (5), Manzanera i kolega (2009.)(10), Souamesa i njegova tima (2006.),(7), koji nisu ustanovili statistički značajnu razliku u potrebi za ortodontskom terapijom među spolovima, u našem istraživanju dobivena je statistički značajna razlika u vrijednostima DHC-a u odnosu prema spolu te su pronađene više vrijednosti kod djevojčica.

Iznenađuje činjenica da je manjak zuba zbog ekstrakcija i promjene koje zbog toga nastaju, češći kod djevojčica negoli kod dječaka, iako bi se moglo očekivati da će se djevojčice više brinuti za svoj izgled, pa tako i za oralno zdravlje.

Razliku između spolova uočio je i Dias (2009.),(11), ali on je ustanovio veću potrebu za ortodontskom terapijom kod dječaka negoli kod djevojčica.

Procjena potrebe za ortodontskom terapijom na osnovi AC-komponente kod IOTN-a pokazala je da samo kod 3,7 posto ispitanika doista treba ortodontsku terapiju. Ti rezultati slažu se s onima ostalih autora – Burdena i Holmesa (1994.), Üçüncüja i Ertugayja (2001.), Abu Alhaija i suradnika (2004.),(6), Souamesa i kolega (2006.),(7), Nobila i njegova tima (2007.),(8), Manzanera i suradnika (2009.),(10) i Diasa (2009.),(11). Ta velika razlika u potrebama za ortodontskom terapijom prema DHC-u i AC-0 u sklopu IOTN-a, posljedica je nekih odlika malokluzije, kao što su nedostajući zubi, križni zagriz bočnih zuba, djelomice nikli, zaostali ili impaktirani zubi (klasificirani prema DHC-u u sklopu IOTN-a kao definitivna potreba za ortodontskom terapijom), nemaju uvijek utjecaj na estetiku (3, 11, 14).

Ovo istraživanje nije pokazalo statistički značajnu razliku potrebe za ortodontskom terapijom između spolova prema AC-komponenti IOTN-a, što se slaže s rezultatima Üçüncüja i Ertugayja (2001.),(5) te Souamesa i suradnika (2006.),(7).

Rezultati ovog istraživanja osnova su za podatke o potrebi za ortodontskom terapijom djece između 12 i 14 godina u Bosni koji će pomoći da se odrede terapijski prioriteti i planira raspodjela resursa zubnog zdravlja. Budući da je potreba za ortodontskom terapijom među promatranom djecom iz Bosne ustanovljena na temelju IOTN-a vrlo visoka, što pokazuje da je oralno zdravlje loše, prijeko je potrebno predložiti i primijeniti preventivne mjere.

tal policy, poor socio-economic status and a change in living conditions during and after the war (13). High level of orthodontic treatment need among Bosnian schoolchildren is the result of poor preventive measures and consequently poor oral/dental health.

Similar to our results, in 546 subjects aged 11 – 15 years, Nobile et al. (2007), (8) found the definite need for orthodontic treatment in 59.5 % of subjects.

In contrast to the studies of Üçüncü and Ertugaya (2001), (5), Manzanera et al. (2009), (10), Souames et al (2006), (7) who had not observed a statistically significant difference in orthodontic treatment need between genders, in the present study there was a statistically significant difference in DHC scores regarding gender, with greater need recorded in girls. A surprising fact is that the lack of teeth due to extraction and changes that occur subsequently is more prevalent among girls than boys, which are expected to be more concerned about their appearance and consequently tend to take better care of their oral health.

The difference between the genders was also noted by Dias (2009), (11), but he found a greater need for orthodontic treatment among boys.

Assessment of orthodontic treatment need based on the Aesthetic Component (AC) of IOTN showed that only 3.7 % of subjects had definite need for orthodontic treatment. These results are in agreement with other authors - Burden and Holmes (1994), Üçüncü and Ertugay (2001), Abu Alhaija et al. (2004), (6), Souames et al. (2006), (7), Nobile et al. (2007), (8), Manzanera et al.(2009), (10), Dias (2009), (11). This high discrepancy between treatment needs, according to the DHC and AC of the IOTN, is due to the fact that malocclusion traits, such as missing teeth, crossbites of posterior teeth, partially erupted, tipped or impacted teeth (classified by DHC of IOTN as definite need for orthodontic treatment) does not always have an aesthetic impact (3,11,14).

The present investigation showed no statistically significant difference between genders in orthodontic treatment need, according to the Aesthetic Component of IOTN, which is consistent with the results of Üçüncü and Ertugay (2001), (5) and Souames et al. (2006), (7).

The results of this study provide baseline data on the orthodontic treatment needs of 12-14 year-old Bosnian children which will help to decide on treatment priorities and planning for community dental health resources. Since orthodontic treatment need among Bosnian children observed through the IOTN is very high, which is the result of poor oral health, it is necessary to develop and implement preventive measures.

Abstract

Aim: The aim of this study was to determine the orthodontic treatment need in a sample of $12 - 14$ year-old Bosnian schoolchildren, using the Dental Health Component (DHC) and Aesthetic Component (AC) of IOTN as well as to determine the possible factors associated with this necessity. **Methods:** Two hundred and ninety-five schoolchildren (152 boys and 143 girls) from four primary schools in Sarajevo, who had not previously received orthodontic treatment, were examined. One examiner, who had been previously trained in the use of the Index of Orthodontic Treatment Need, screened all the schoolchildren. **Results:** According to DHC, definite need for orthodontic treatment was found in 53.6 % of subjects; and there was statistical significantly difference between genders. Orthodontic treatment need, according to AC, was found only in 3.7 % of subjects; and there was no statistical difference between genders. **Conclusions:** The results of this study provide baseline data on the orthodontic treatment needs of 12-14 year-old Bosnian children, which will help to decide the treatment priorities and planning community dental health resources. Since orthodontic treatment need among Bosnian children observed trough the IOTN is very high, which is the result of poor oral health, it is necessary to develop and implement preventive measures.

Address for correspondence
Vildana Džemidžić
University of Sarajevo
School of Dental Medicine
Department of Orthodontics
Bolnička 4a, 1000 Sarajevo, B&H
Tel: +387 33 214 249
Fax: +387 33 443-395
vdzemidzic@sf.unsa.ba

References

1. Brook PH, Shaw WC. The development of an index of orthodontic treatment priority. Eur J Orthod. 1989 Aug;11(3):309-20.
2. Shaw WC, O'Brien KD, Richmond S, Brook P. Quality control in orthodontics: risk/benefit considerations. Br Dent J. 1991 Jan 5;170(1):33-7.
3. Burden DJ, Holmes A. The need for orthodontic treatment in the child population of the United Kingdom. Eur J Orthod. 1994 Oct;16(5):395-9.
4. Chestnutt IG, Burden DJ, Steele JG, Pitts NB, Nuttall NM, Morris AJ. The orthodontic condition of children in the United Kingdom, 2003. Br Dent J. 2006 Jun 10;200(11):609-12.
5. Uçüncü N, Ertugay E. The use of the Index of Orthodontic Treatment need (IOTN) in a school population and referred population. J Orthod. 2001 Mar;28(1):45-52.
6. Abu Alhaija ES, Al-Nimri KS, Al-Khateeb SN. Orthodontic treatment need and demand in 12-14-year-old north Jordanian school children. Eur J Orthod. 2004 Jun;26(3):261-3.
7. Souames M, Bassigny F, Zenati N, Riordan PJ, Boy-Lefevre ML. Orthodontic treatment need in French schoolchildren: an epidemiological study using the Index of Orthodontic Treatment Need. Eur J Orthod. 2006 Dec;28(6):605-9.
8. Nobile CG, Pavia M, Fortunato L, Angelillo IF. Prevalence and factors related to malocclusion and orthodontic treatment need

in children and adolescents in Italy. Eur J Public Health. 2007 Dec;17(6):637-41.
9. Josefsson E, Bjerklin K, Lindsten R. Malocclusion frequency in Swedish and immigrant adolescents--influence of origin on orthodontic treatment need. Eur J Orthod. 2007 Feb;29(1):79-87.
10. Manzanera D, Montiel-Company JM, Almerich-Silla JM, Gandía JL. Orthodontic treatment need in Spanish schoolchildren: an epidemiological study using the Index of Orthodontic Treatment Need. Eur J Orthod. 2009 Apr;31(2):180-3.
11. Dias PF, Gleiser R. Orthodontic treatment need in a group of 9-12-year-old Brazilian schoolchildren. Braz Oral Res. 2009 Apr-Jun;23(2):182-9.
12. Zukanović A. Efficiency of „Cariogram" model in evaluation of caries risk-factors in 12-years old children [Master's Thesis]. Sarajevo: University of Sarajevo; 2005.
13. Zukanović A, Ganibegović M. Preventive dentistry in Bosnian private dental practices. Acta Stomatol Croat. 2007; 41(3):193-204.
14. Ngom PI, Diagne F, Dieye F, Diop-Ba K, Thiam F. Orthodontic treatment need and demand in Senegalese school children aged 12-13 years. An appraisal using IOTN and ICON. Angle Orthod. 2007 Mar;77(2):323-30.