

Sandra Anić Milošević¹, Stjepan Siber², Marina Lapter Varga¹, Mladen Šlaj¹

Debljina profila mekih tkiva kod ispitanika klase I i klase II/1 (u dobi od 12 godina)

Thickness of Soft Tissue Profiles in Subjects with Class I and Class II/1 (Age 12 Years)

¹ Zavod za ortodontiju Stomatološkog fakulteta Sveučilišta u Zagrebu, Gundulićeva 5, Zagreb
Department of Orthodontics, School of Dental Medicine University of Zagreb

² Privatna stomatološka ordinacija "Dentist", Zagrebačka 8, Osijek
Private Dental Clinic "Dentist", Zagrebačka 8, Osijek

Sažetak

Svrha istraživanja bila je na laterolateralnim rentgenogramima, pomoću horizontalnih linearnih varijabli, ustanoviti razliku u debljini mekog tkiva kod ispitanika s klasom I i klasom II/1 te utvrditi razlike navedenih varijabli s obzirom na spol. U istraživanju je korišteno 56 laterolateralnih rentgenograma - 30 s klasom I (16 dječaka i 14 djevojčica) i 26 s klasom II/1 (11 dječaka i 15 djevojčica) u dobi od 12 godina. Mjerenje debljine mekih tkiva obavljeno je pomoću pet horizontalnih parametara, a dobivene vrijednosti statistički su obrađene Studentovim t-testom.

Statističkom analizom ustanovljeno je da među spolovima u klasi I postoji razlika u točki A'; kod klase II/1 razlika je u točki Li; analiza dječaka između klase I i II/1 također pokazuje razlike u točki A'; analiza djevojčica između klase I i II/1 pokazuje razlike u točki Ls, a ukupna analiza klase I i II/1, bez obzira na spol, pokazuje razliku u točkama A' i Ls.

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Adresa za dopisivanje
Dr. sc. Sandra Anić Milošević
Zavod za ortodontiju
Stomatološki fakultet
Gundulićeva 5, 10 000 Zagreb
sanic@sfzg.hr

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Uvod

Profil mekih tkiva važan je kod planiranja ortodontske terapije, a različitosti su u varijacijama skeletalnog konveksiteta, mekom tkivu i protruziji usana te položaju donjih sjekutića (1, 2). Ispravljaju li se malokluzije uglavnom se utječe i na promjene u izgledu donje trećine lica (3-5). No, meko tkivo koje prekriva kosti i zube toliko se može razlikovati da dentoskeletalni međučeljsni odnos može biti nedovoljna vodilja za procjenu disharmonije lica (6, 7). Promjenom odnosa između tvrdih tkiva događa se i preraspodjela mekih, pa zato terapija koja se temelji samo na skeletalnim standardima može rezultirati neskladom u proporcijama lica (8-12). Kako bi se izbjegle veće pogreške, potrebna je detaljnija analiza facijalnih struktura (3-5, 12). Danas su dostupne

Introduction

The soft tissue profile has an important role in the planning of the orthodontic treatment, and differences are perceived in the variations of skeletal convexity, soft tissue and protrusion of the lips, and also in the position of the lower incisors (1, 2). Correction of malocclusion mainly effects changes in the appearance of the lower facial third (3-5). However, the soft tissue which covers the bone and the teeth can differ to such an extent that the dentoskeletal jaw relationship can be an inadequate guide for evaluation of facial disharmony (6, 7). Changed relation between the hard tissues leads to redistribution of the soft tissues, so the treatment based only on skeletal standards can result in disharmonious facial proportions (8-12). In order to avoid great

mnoge metode za procjenu facijalnih promjena i različitosti, uključujući: antropometriju, fotogrametriju, kompjutorsku obradu - "imaging" i kefalometriju (13, 14). Skeletalne norme pomažu nam odrediti vrste terapija i omogućuju da predvidimo njihove rezultate, ali izgled mekog tkiva samo djelomice ovisi o potpornim tvrdim strukturama (8). Kako bi se pravilno predvidio odgovor mekoga tkiva na promjene položaja tvrdoga tkiva, nužno je razumjeti što se događa s mekim tkivom u odnosu prema ortodontskim i ortopedskim promjenama (15 -22) te uzeti u obzir i njihov rast i razvoj (23 -31).

Različiti izgled profila rezultat je mnogih čimbenika. Na to kakav i kolik će biti učinak terapije na izgled pacijenta, osim zuba, utječu spol i dob, zatim vrsta terapije te oblik i napetost usana - jedan od glavnih čimbenika za izgled lica. Danas je opće prihvaćeno mišljenje da ortodontski pomak zuba može promijeniti izgled lica (3-5).

Budući da se većina dentofacijalnih nepravilnosti i promjena nastalih ortodontskom terapijom, najjasnije odražava na profilu (29), svrha ovog istraživanja jest na laterolateralnim rendgenogramima, pomoću horizontalnih linearnih varijabli, odrediti razliku debljine mekog tkiva kod ispitanika s klasom II/1 i klasom I te ustanoviti razlike navedenih varijabli glede spola.

Uzorak i postupci

Podaci su se počeli skupljati odabirom iz zbirke odgovarajućih laterolateralnih rendgenograma glave u Zavodu za ortodonciju Stomatološkog fakulteta Sveučilišta u Zagrebu. Prikupljeno ih je 56, ispitanici su bili u dobi od 12 godina, a podijeljeni su u dvije skupine. U prvoj skupini bilo je 30 ispitanika s dentalnom i skeletalnom klasom I (16 dječaka i 14 djevojčica), a u drugoj oni s distookluzijom, to jest klasom II/1 (11 dječaka i 15 djevojčica).

Pausov papir precizno je postavljen i fiksiran na snimku. Olovkom su prenesene konture mekih tkiva profila, sella turcica, frontalna i nazalna kost, dno orbite, maxilla, mandibula, odnos gornjeg i donjeg centralnog sjekutića te odnos prvoga donjeg molara i njegova antagonista. Sljedeći potez bio je ucrtati rendgenkefalometrijske referentne točke (Slika 1.):

- A' točka najvećeg konkavитета na sredini gornje usne između točaka subnasale i labrale superius
- A Subspinale – najdublja točka konkavитета prednje konture processusa alveolarisa maxillae
- Ls Labrale superius – najanteriornija točka gornje usne

er errors, it is necessary to perform detailed analysis of the facial structures (3-5, 12). Today, many methods for evaluation of facial changes and diversity are available, including anthropometry, photogrammetry, computer imaging and cephalometry (13, 14). Skeletal norms are of assistance during determination of the type and prediction of the result of treatment, although the appearance of the soft tissue only partially depends on the support of the hard structures (8). In order to correctly predict the response of the soft tissue to the changed position of the hard tissue, it is important to understand the behaviour of the soft tissue with regard to orthodontic and orthopaedic changes (15-22), as well as to take into account its growth and development (23-31).

The different appearance of the profile is a result of a number of factors. The effect the treatment will have on the patient's appearance, apart from the teeth, is influenced by the sex and age of the patient, the type of treatment and the contour and tension of the lips, one of the main factors in facial appearance. Today, it is generally accepted that orthodontic movement of the teeth can change the appearance of the face (3-5).

As the majority of dentofacial deformities, including changes arising from the effect of orthodontic treatment, are most clearly reflected in the profile (29), the object of this investigation was to determine the differences in thickness of the soft tissue in subjects with class II/1 and class I by means of horizontal linear variables on laterolateral radiographs, as well as the differences in the aforementioned variables with regard to sex.

Sample and methods

The data were taken from the records of relevant laterolateral radiographs of the head in the Department of Orthodontics at the School of Dental Medicine University of Zagreb. Fifty-six laterolateral radiographs of subjects aged 12 years were collected and divided in two groups. The first group consisted of 30 subjects with dental and skeletal class I (16 boys and 14 girls) and the second group consisted of subjects with class II/1 (11 boys and 15 girls).

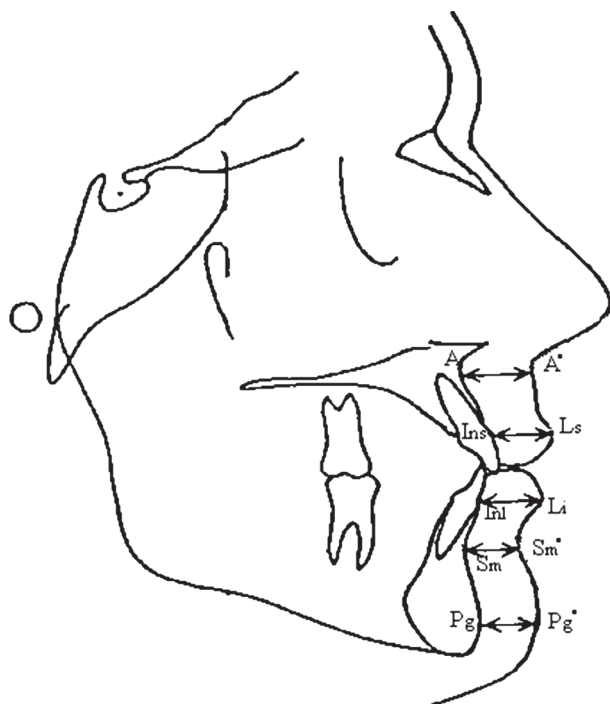
Tracing paper was carefully fixed onto the radiograph and the contours of the soft tissue profiles, sella turcica, frontal and nasal bone, orbit floor, maxilla, mandible, relation of the upper and lower central incisor, and the relation of the first lower molar and its antagonist copied by pencil. The next step was the drawing in of roentgencephalometric reference landmarks (Figure 1):

- Ins točka na prijelazu krune u korijen gornjega središnjeg sjekutića
- Li labrale inferius – najanteriornija točka donje usne
- Inl točka na prijelazu krune u korijen donjega središnjeg sjekutića
- Sm' supramentale – točka najvećeg konkavитета u sredini donje usne između točaka labrale inferius i točke pogonion
- Sm supramentale – najdublja točka konkavитета prednje konture processusa alveolarisa mandibulae
- Pg' pogonion – najanteriornija točka mekog tkiva brade
- Pg pogonion – najanteriornija točka koštane konture brade

Spajanjem svake točke na mekom tkivu s odgovarajućom točkom na koštanom tkivu, dobilo se pet horizontalnih linija (Slika 1.)

- A' – A debljina gornje usne u točki A'
- Ls – Ins debljina gornje usne u točki Ls
- Li – Inl debljina donje usne u točki Li
- Sm' – Sm debljina supramentalnog tkiva u točki Sm'
- Pg' – Pg debljina mekog tkiva brade u točki Pg'

Nakon precizno povučenih linija, udaljenost u milimetrima mjerena je pomičnom mjerkom.



Slika 1. Prikaz rtg-kefalometrijskih točaka i horizontalnih varijabli za mjerenje debljine profila mekog tkiva
Figure 1 Soft tissue landmarks and horizontal variables for measuring the thickness of the soft tissue profile

- A' The landmark of the greatest concavity on the middle upper lip between the subnasale point and labrale superius.
- A Subspinale - the deepest landmark of concavity of the frontal contour of the processus alveolaris maxillae.
- Ls Labrale superius - the most anterior landmark of the upper lip.
- Ins The landmark on the transition of the crown into the root of the upper middle incisor.
- Li Labrale inferius - the most anterior landmark of the lower lip.
- Inl The landmark on the transition of the crown into the root of the lower middle incisor.
- Sm' Supramentale - the landmark of the greatest concavity in the middle of the lower lip between the labrale inferius point and the pogonion point.
- Sm Supramentale - the deepest landmark of concavity of the frontal contour of the processus alveolaris mandibulae.
- Pg' pogonion - the most anterior landmark of the soft tissue of the chin.
- Pg pogonion - the most anterior landmark of the bony contour of the chin.

By joining each landmark on the soft tissue with the appropriate landmark on the hard tissue the following five horizontal lines were obtained (Figure 1).

- A' - A Thickness of the upper lip in landmark A'
- Ls - Ins Thickness of the upper lip in landmark Ls
- Li - Inl Thickness of the lower lip in landmark Li
- Sm' - Sm Thickness of the supramental tissue in landmark Sm'
- Pg' - Pg Thickness of the soft tissue of the chin in landmark Pg'

After the lines had been precisely drawn, distances in mm were measured with a calliper. The results obtained were classified according to sex and class and analysed by statistical methods. Student t-test

Dobiveni rezultati razvrstani su prema spolu i klasama te obrađeni statističkim metodama. Za analizirane varijable uporabljen je Studentov t-test kako bi se testirale razlike između aritmetičkih sredina malih nezavisnih uzoraka. Koristila se i standardna devijacija, kao prosječno odstupanje mjerenja od aritmetičke sredine. Kao stupanj statističke znatnosti uzeta je vjerojatnost $p < 0,05$. Dakle, statistički znatne razlike pokazuju $p < 5\%$, što znači da se dobiveni rezultat potvrđuje s 95% sigurnosti (32). Za statističku analizu koristio se Smith's Statistical Package freeware (Version 2.5, August 30, 2001.).

Rezultati

Na Tablici 1. predstavljena je statistička obrada mjerenih podataka za analizu debljine mekih tkiva glede spola kod klase I. Studentovim t-testom određena je razlika u debljini mekog tkiva u točki A'. Kod dječaka s klasom I, debljina mekog tkiva u točki A' veća je za 1,2 mm u odnosu prema djevojčicama. Analizom debljine mekih tkiva među spolovima kod klase II/1, ustanovljena je razlika u debljini donje usne. Rezultati pokazuju veću debljinu donje usne u točki Li za 2,7 mm kod dječaka klase II/1, u odnosu prema djevojčicama (Tablica 2.).

Analiza debljine mekih tkiva kod dječaka između klase I i II/1, pokazala je da je meko tkivo u točki A' deblje za 1,5 mm kod dječaka s klasom I, u odnosu prema dječacima s klasom II/1. (Tablica 3.)

was used for the analysed variables to test the differences between the arithmetic means of the independent samples. Standard deviation was also used as the average deviation of measurements from the arithmetic mean. Probability of $p < 0.05$ was taken as the degree of statistical significance. Consequently, $p < 5\%$ indicates statistically significant difference, which means that the result obtained was confirmed with 95% certainty (32). Smith's Statistical Package Freeware was used for statistical analysis (Version 2.5, August 30, 2001, <http://www.economics.pomona.edu./Statsite/SSP.html/>).

Results

Table 1 shows statistical analysis of the measured data for analysis of the soft tissue thickness with regard to sex in class I. Difference in the soft tissue thickness in landmark A' was determined by Student t-test. In boys with class I soft tissue thickness in landmark A' was 1.2 mm thicker in relation to the girls. Analysis of the soft tissue thickness between the sexes in class II/1 showed some differences in the thickness of the lower lip. The results show greater thickness of the lower lip in landmark Li of 2.7 mm in boys with class II/1 in relation to the girls (Table 2).

Analysis of the soft tissue thickness in boys between class I and II/1 showed that the soft tissue in A' landmark was thicker by 1.5 mm in boys with class I in relation to boys with class II/1 (Table 3).

Tablica 1. Analiza debljine mekih tkiva glede spola kod klase I.

Table 1 Analysis of the soft tissue thickness and sex differences in class I subjects

Varijabla • Variable	Klasa • Class I M • Male Sr.vrijed. • Mean (SD)	Klasa • Class I Ž • Female Sr.vrijed. • Mean (SD)	DF	t-vrijednost • t-value	P
A' – A	16,5 (1,53)	15,3 (1,38)	28	2,29	0,030
Ls – Ins	15,8 (2,27)	15,6 (1,23)	28	0,391	0,699
Ls – Inl	17,2 (1,52)	16,5 (1,43)	28	1,32	0,196
Sm' – Sm	12,0 (1,85)	11,7 (1,05)	28	0,531	0,600
Pg' – Pg	12,6 (2,38)	11,4 (2,36)	28	1,28	0,213

Tablica 2. Analiza debljine mekih tkiva glede spola kod klase II/1.

Table 2 Analysis of the soft tissue thickness in class II/1 subjects regarding sex differences

Varijabla • Variable	Klasa • Class II/1 M • Male Sr.vrijed. • Mean (SD)	Klasa • Class II/1 Ž • Female Sr.vrijed. • Mean (SD)	DF	t-vrijednost • t-value	P
A' – A	14,6 (2,36)	14,8 (2,23)	24	0,126	0,901
Ls – Ins	14,5 (3,28)	13,9 (2,58)	24	0,477	0,638
Li – Inl	18,3 (1,94)	15,6 (2,94)	24	2,63	0,015
Sm' – Sm	12,3 (2,19)	11,8 (1,55)	24	0,615	0,545
Pg' – Pg	13,1 (4,05)	13,0 (3,39)	24	0,112	0,912

SD – Standardna devijacija • Standard deviation; DF – Stupnjevi slobode • Degrees of freedom; t – Student t-test; P – Razina značajnosti • Significance level

Tablica 3. Analiza debljine mekih tkiva kod dječaka između klase I i II/1.

Table 3 Analysis of the soft tissue thickness between the boys with class I and II/1

Varijabla • Variable	Klasa • Class I M • Male Sr.vrijed. • Mean (SD)	Klasa • Class II/1 M • Male Sr.vrijed. • Mean (SD)	DF	t-vrijednost • t-value	P
A' - A	16,5 (1,53)	14,6 (2,36)	25	2,46	0,021
Ls - Ins	15,8 (2,27)	14,5 (3,28)	25	1,30	0,206
Li - Inl	17,2 (1,52)	18,3 (1,94)	25	1,55	0,135
Sm' - Sm	12,0 (1,85)	12,3 (2,19)	25	0,378	0,709
Pg' - Pg	12,6 (2,38)	13,1 (4,05)	25	0,475	0,639

Tablica 4. Analiza debljine mekih tkiva djevojčica između klase I i II/1.

Table 4 Analysis of the soft tissue thickness between the girls with class I and II/1

Varijabla • Variable	Klasa • Class I Ž • Female Sr.vrijed. • Mean (SD)	Klasa • Class II/1 Ž • Female Sr.vrijed. • Mean (SD)	DF	t-vrijednost • t-value	P
A' - A	15,3 (1,38)	14,6 (2,38)	27	0,865	0,395
Ls - Ins	15,6 (1,23)	13,9 (2,58)	27	2,19	0,037
Li - Inl	16,5 (1,43)	15,6 (2,94)	27	1,07	0,292
Sm' - Sm	11,7 (1,05)	11,8 (1,55)	27	0,286	0,777
Pg' - Pg	11,4 (2,36)	13,0 (3,39)	27	1,40	0,173

Tablica 5. Analiza debljine mekih tkiva klase I i II/1 bez obzira na spol.

Table 5 Analysis of the soft tissue thickness in class I and class II/1 with no sex differences

Varijabla • Variable	Klasa • Class I (M • Male + Ž • Female) Sr.vrijedn. • Mean (SD)	Klasa • Class II/1 (M • Male + Ž • Female) Sr.vrijedn. • Mean (SD)	DF	t-vrijednost • t-value	P
A' - A	15,9 (1,56)	14,6 (2,32)	54	2,44	0,018
Ls - Ins	15,7 (1,83)	14,1 (2,85)	54	2,49	0,016
Li - Inl	16,9 (1,50)	16,7 (2,86)	54	0,305	0,762
Sm' - Sm	11,8 (1,58)	12,0 (1,82)	54	0,390	0,698
Pg' - Pg	12,0 (2,40)	13,0 (3,61)	54	1,25	0,217

SD – Standardna devijacija • Standard deviation; DF – Stupnjevi slobode • Degrees of freedom; t – Student t-test;
P – Razina značajnosti • Significance level

Na Tablici 4. predstavljena je analiza debljine mekih tkiva djevojčica između klase I i II/1, a ističe se razlika u debljini gornje usne u točki Ls. Meko tkivo gornje usne pokazuje veću debljinu kod djevojčica s klasom I za 1,7 mm, u odnosu prema djevojčicama s klasom II/1.

Kod usporedbe klase I i II/1, statističkom analizom podataka ustanovljeno je da se debljina mekog tkiva - bez obzira na spol - znatno razlikuje u dva parametra: meko tkivo mjereno u točki A' deblje je za 1,3 mm kod ispitanika klase I, u odnosu prema ispitanicima klase II/1 te meko tkivo mjereno u točki Li također je deblje kod ispitanika klase I za 1,6 mm, u odnosu prema ispitanicima klase II/1 (Tablica 5.).

Table 4 shows analysis of the soft tissue thickness between the girls with class I and II/1, in which the difference in the thickness of the upper lip in Ls landmark is visible. The soft tissue of the upper lip showed greater thickness in girls with class I of 1.7 mm in relation to girls with class II/1.

Statistical analysis of the data for comparison between classes I and II/1 showed that the soft tissue thickness, regardless of sex, differed essentially with regard to two parameters: the soft tissue measured in landmark A' was thicker by 1.3 mm in subjects with class I in relation to subjects with class II/1 and the soft tissue measured in landmark Li was also thicker in subjects with class I by 1.6 mm in relation to subjects with class II/1 (Table 5.).

Rasprava

Promjene na profilu mekih tkiva rezultat su skeletnoga rasta i debljine pokrovnoga mekog tkiva (31). Skladan profil mekih tkiva lica često je vrlo teško postići zbog toga što je meko tkivo koje prekriva zube i kosti dosta varijabilno u debljini. Masa mekih tkiva koja prekriva čvrstu podlogu sastavljena je od epitela, vezivnog tkiva i mišića, promjenjiva je te ovisi o spolu, godinama i okluziji. Te varijacije uvjetuju temeljitu analizu mekog tkiva, kako bi se na kraju ortodontske terapije osigurao skladan odnos dentofacijalnih struktura (3, 4).

Na LL-rendgenogramima 56 ispitanika obaju spolova u dobi od 12 godina, kefalometrijskom analizom uspoređena je debljina mekih tkiva s obzirom na spol i klasu.

Analiza dječaka i djevojčica s klasom I (Tablica 1.) pokazala je kako postoji veća razlika samo u jednom od pet ispitivanih parametara. Dječaci s klasom I imaju veću debljinu mekog tkiva u točki A' za 1,2 mm, u odnosu prema djevojčicama.

Burstone (1,2) je također uočio razlike glede spola u rastu mekog tkiva subnazalne regije te povećanje debljine kod muških ispitanika.

Blanchette i suradnici (26), na uzorku ispitanika obaju spolova u dobi između 7 i 17 godina, longitudinalno su proučavali meko tkivo profila. Ističu da se debljina mekog tkiva u točki A', u razdoblju između 8. i 16. godine poveća kod dječaka "dugog lica" za 3,6 mm, a kod dječaka "kratkog lica" za 3,1 mm. U istom razdoblju, kod djevojčica "dugog lica" zapaženo je povećanje od 2,9 mm, a kod djevojčica "kratkog lica" za 2,3 mm. Iz toga istraživanja jasno se vidi znatno manje povećanje debljine mekog tkiva u točki A' kod djevojčica, u odnosu prema dječacima.

Analiza klase II/1 glede spolova (Tablica 2.) također pokazuje znatniju razliku samo u jednom parametru. Debljina mekog tkiva u točki Li veća je kod dječaka za 2,7 mm, u odnosu prema djevojčicama.

Istraživanje Blanchetta i suradnika (26) pokazuje da se kod djevojčica "dugog lica" povećalo meko tkivo u točki Li za 1,2 mm, a kod dječaka "dugog lica" za 0,8 mm, u razdoblju između 7. i 17. godine, što je slično rezultatima našeg istraživanja. Autori također ističu da se debljina i dužina usana tijekom rasta razlikuje kod dolihokefala i brahikefala te kako se kod jednih i drugih kompenziralo meko tkivo.

Dobiveni rezultati analize dječaka s klasom I i II/1 pokazuju da nema većih razlika u debljini me-

Discussion

Soft tissue profile change is a result of both underlying skeletal growth and overlying soft tissue thickness (31). Harmonious soft tissue facial profile is very difficult to achieve due to considerable variation of soft tissue thickness. The mass of soft tissue that covers the bone, consisting of epithelia, connective tissue and muscle, varies according to sex, age and occlusion. These variations require detailed soft tissue analysis in order to ensure harmonious dentofacial structures at the end of the orthodontic treatment (3, 4).

The thickness of soft tissues, with regard to sex and class, was compared by means of cephalometric analysis on the LL-radiographs of 56 12-year-old subjects of both sexes.

The analysis of boys and girls with class I (Table 1.) showed essential differences in only one of the five examined parameters. Boys with class I showed greater thickness of the soft tissue in landmark A' by 1.2 mm in relation to the girls.

Burstone (1, 2) also noticed differences with regard to sex in the growth of soft tissue of the subnasal region, with increased thickness in male subjects.

Blanchette et al (26) studied the soft tissue profile longitudinally on a sample of subjects of both sexes, aged from 7 to 17 years. He reported that the thickness of the soft tissue in landmark A' from the 8th to the 16th year increased in boys with a "long face" by 3.6 mm and in boys with a "short face" by 3.1 mm. During the same period, in girls with a "long face" increase of 2.9 mm was observed, and in girls with a "short face" it was 2.3 mm. In this investigation a significantly smaller increase in thickness of the soft tissue was observed in landmark A' in girls in relation to boys.

Analysis of class II/1 with regard to sex (Table 2.) also showed a more significant difference in only one parameter. The thickness of the soft tissue in landmark L was greater in boys by 2.7 mm in relation to the girls.

Investigations carried out by Blanchette et al (26) showed that in girls with a "long face" there was an increase in the thickness of the soft tissue in landmark Li of 1.2 mm and in boys with a "long face" of 0.8 mm in the period between the 7th and 17th year, which is similar to the results obtained in this investigation. The authors also reported that the thickness and length of the lips during growth differ in dolychcephaly and brachycephaly, and that in both cases occurs the compensation of soft tissues.

kih tkiva, osim u točki A'. Kod dječaka klase I veća je debljina mekog tkiva u točki A' za 1,5 mm u odnosu prema dječacima klase II/1, a analizom djevojčica između klasa (Tablica 4.) dobivena je razlika u točki Ls, gdje je debljina mekog tkiva za 1,7 mm veća kod djevojčica s klasom I.

Analizom klase I i II/1 (Tablica 5.), bez obzira na spol, ustanovljena je razlika u dvama parametrima. Meko tkivo u točki A' deblje je kod ispitanika klase I za 1,3 mm, a u točki Li za 1,6 mm, u odnosu prema ispitanicima klase II/1.

Na temelju dobivenih rezultata (Tablice 3., 4., 5.) moguće je zaključiti da je razlika u debljini mekog tkiva između klase I i II/1 rezultat moguće kompenzacije koštanih ili dentalnih nepravilnosti mekim tkivom. Kako su kod klase II/1 incizivi protrudirani, gornja se usna nalazi anteriornije, ali je i debljina mekog tkiva manja kako bi profil ostao u granicama "normalnoga".

Subtelny (23, 30) zaključuje da se neka područja mekog tkiva razlikuju od koštane podloge, a druga - poput usana - pokazuju sklonost da slijede promjene koštanog tkiva. Debljina i dužina usana rastom se povećavaju do 15. godine, a zatim ostaju uglavnom konstantne. Također navodi podatke o rastu u debljini mekog tkiva brade u dobi između 3 i 18 godina. Ističe da je kod dječaka ukupan porast 2,4 mm, a kod djevojčica je manji - samo 1,0 mm. Burstone (1, 2) je pronašao porast debljine mekog tkiva u točki supramentale (Sm) od 0,2 mm kod dječaka i 0,9 mm kod djevojčica, a u području točke pogonion (Pg) porast od 0,8 mm u oba spola. Promjene su minimalne, jer uzorak uključuje i adolescente i odrasle osobe. Holdaway ističe važnost mekog tkiva brade za cjelokupni estetski dojam profila. Horizontalna mjera debljine mekog tkiva brade (od točke suprapogonion na tvrdom tkivu do suprapogonion na mekom tkivu) iznosi u prosjeku 10 do 12 mm (12).

Gornja i donja čeljust sudjeluju u oblikovanju glavnog dijela skeleta lica i u bliskom su odnosu s ostalim kostima lica. Promjene koštane osnove jedne čeljusti mogu zato utjecati na suprotnu čeljust, susjedne kosti te meka tkiva. Tijekom planiranja ortodontskog tretmana treba uzeti u obzir da te strukture čine nerazdvojnu cjelinu i tako osiguravaju skladan izgled lica (33).

The results obtained from the analysis of boys with class I and II/1 did not show greater differences in the thickness of soft tissues, except in landmark A'. Boys with class I showed greater thickness of soft tissue in landmark A' of 1.5 mm in relation to boys with class II/1. On the other hand the analysis of girls with class I and II/1 (Table 4.) showed that a difference was determined in landmark Ls, because the thickness of the soft tissue was 1.7 mm greater in girls with class I.

The analysis of classes I and II/1 (Table 5.), regardless of sex, showed a difference in two parameters. The soft tissue in landmark A' showed greater thickness in subjects with class I by 1.3 mm and in landmark Li by 1.6 mm in relation to the subjects with class II/1.

Based on the results (Tables 3, 4, 5) we can conclude that the difference in thickness of the soft tissue between classes I and II/1 is a result of possible compensation of the bony or dental deformity by the soft tissue. In class II/1 the incisors are protruded, the upper lip is more anterior, and the thickness of the soft tissue is thinner, so that the profile can remain within "normal" boundaries.

Subtelny (23, 30) concluded that some areas of soft tissue differ from the bony base, while others, such as lips, show a tendency to follow the changes in the bone. With growth the thickness and length of the lips increase until the 15th year and usually remain constant. There is data on soft tissue thickness increase at the chin between the 3rd and 18th year, amounting to 2.4 mm in boys and 1.0 mm in girls. Burstone (1, 2) found an increase in the soft tissue thickness in the supramentale point (Sm) by 0.2 mm in boys and 0.9 mm in girls, and 0.8 mm in the area at the pogonion point (Pg) for both sexes. Changes were minimal due to the fact that the sample included both adolescents and adults. Holdaway stresses that one of the fundamental traits associated with facial beauty includes a soft tissue chin that is nicely positioned in the facial profile. The horizontal measurement of the soft tissue chin thickness (from the hard tissue suprapogonion to the soft tissue suprapogonion) is between 10 and 12 mm. (12)

The upper and lower jaws participate in the formation of the main part of the facial skeleton and are closely related to other facial bones. Changes in the bony base of one jaw can be reflected in the opposite jaw, adjacent hard and soft tissues. When planning orthodontic treatment it should be borne in mind that these structures comprise an inseparable whole and consequently ensure a harmonious facial appearance (33).

Zaključci

Provedenim mjerenjem i statističkom obradom podataka zaključeno je sljedeće:

- kod ispitanika s klasom I, s obzirom na spol, statistički je znatna razlika u debljini mekog tkiva samo u točki A'
- kod ispitanika s klasom II/1 statistički je znatna razlika u debljini mekog tkiva u točki Li
- usporedbom dječaka klase I i II/1, znatna je razlika u debljini mekog tkiva u području točke A'
- usporedbom djevojčica klase I i II/1, zabilježena je statistički znatna razlika u debljini mekog tkiva u području točke Ls
- analizom klase I i II/1, bez obzira na spol, pokazala se statistički znatna razlika u debljini mekog tkiva u točkama A' i Ls

Conclusions

Based on the measurements and the statistical data analysis performed in this investigation, the following conclusions can be made:

- In subjects with class I, regardless of sex, statistically significant difference was found in the thickness of the soft tissue only in landmark A'.
- In subjects with class II/1 statistically significant difference in the thickness of the soft tissue was found in landmark Li.
- By comparing boys with class I and II/1 significant difference in the thickness of the soft tissue in the area of landmark A' was determined.
- By comparing girls with class I and II/1 statistically different difference in the thickness of soft tissue was determined in the area of landmark Ls.
- Analysis of classes I and II/1, regardless of sex, showed statistically significant difference in the thickness of the soft tissue in landmarks A' and Ls.

Abstract

The object of the investigation was to determine the difference in thickness of the soft tissue in subjects with class I and class II/1, by means of horizontal linear variables on laterolateral radiographs, and to determine the differences in the aforementioned variables with regard to sex. Fifty-six laterolateral radiographs of 12-year-old subjects were used for the investigation, out of which 30 with class I (16 boys and 14 girls) and 26 with class II/1 (11 boys and 15 girls). Measurement of the thickness of the soft tissues was performed by means of five horizontal parameters, and the values obtained were statistically analysed by means of Student t-test.

Statistical analysis showed that between the sexes in class I the difference existed in landmark A' and in class II/1 the difference existed in landmark Li. Analysis of boys between classes I and II/1 also showed a difference in landmark A'. Analysis of girls between classes I and II/1 showed a difference in landmark Ls. The total analysis of classes I and II/1, regardless of sex, showed difference in landmarks A' and Ls.

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Address for correspondence

Sandra Anić Milošević
Department of Orthodontics
School of Dental Medicine
Gundulićeva 5, 10 000 Zagreb
e-mail: sanic@sfgz.hr

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