

CURRENT TRENDS IN TURKISH ORTHODONTICS

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ÖZET: Bu çalışmanın amacı 1) Türkiye'deki ortodontik tedavi uygulamalarının bir portresini çıkarmak, 2) Türk ortodontistlerin teşhis ve tedavi tercihlerinin altında yatan faktörleri irdelemek, 3) bu alandaki muhtemel eksiklikleri tespit ederek bu uzmanlık alanındaki ilerlemelere katkıda bulunmak ve 4) daha ileride yapılacak olan ulusal ve uluslararası aynı tür çalışmalar için bir referans oluşturmaktır. Çalışma, Türk ortodontisindeki güncel teşhis ve tedavi tercihlerinin tespit edilmesi için kullanılan kapsamlı bir anketten oluşmaktadır. Toplanan verilerin alt grupları 1) kişisel bilgiler, 2) diyagnostik kayıtlar, 3) sabit tedavi, 4) fonksiyonel tedavi, ağız içi ve ağız dışı aapareyler, 5) bitirme ve retansiyon, 6) ortognatik cerrahi, 7) dudak damak yarıkları ve 8) temporomandibular eklemdir. Anket formu Türk Ortodonti Derneğinin 225 üyesine gönderilmiştir. Cevaplandırılıp geri gönderilen formların sayısı 122, oranı ise % 54,2 dir. Toplanan veriler günümüz Türkiye'sindeki ortodontik tedavinin portresini elde etmek için kullanılmıştır. Çalışmada elde edilen veriler farklı ülkelerde yapılan benzer çalışmalarla karşılaştırılarak tartışılmıştır.

Anahtar Kelimeler: Türk ortodontisi

SUMMARY: CURRENT TRENDS IN TURKISH ORTHODONTICS The aim of this study was 1) to outline a portrait of current orthodontic practice in Turkey, 2) to interpret yielded factors that affect the preferences of Turkish orthodontists. 3) to contribute improvement and progress of orthodontics by detecting any possible deficiencies in Turkish orthodontics and. 4) to constitute a reference for the future national and/or international surveys to make possible the evaluation of changes in Turkish orthodontics. The study composed of a comprehensive questionnaire survey performed to find out the current diagnostic and therapeutic trends in Turkish orthodontics. The subgroups of data collected were about 1) personal information, 2) diagnostic records, 3) fixed appliance therapy, 4) functional treatment, intraoral and extraoral appliances. 5) finishing and retention, 6) orthognathic surgery, 7) clefts of the lip and palate and 8) temporomandibu-

lar joint. The questionnaire was sent to 225 members of the Turkish Orthodontic Society. The number of returned questionnaires was 122 with a return rate of 54.2. The collected data was used to draw a current portrait of orthodontics in Turkey. The study was concluded with comparison and discussion of data with the results of similar studies performed in other countries.

Key Words: orthodontics in Turkey, Turkish orthodontics

INTRODUCTION

Contemporary orthodontic practice is diverse, both in the variety of clinical problems treated and in the methods used. Such heterogeneity makes it difficult to make valid generalizations concerning the characteristics of orthodontic treatment procedures or outcomes; yet, data and methods are required for assessment of issues of efficacy and utility (1).

Rapid progress in the field of orthodontics forces the orthodontists to make a choice between different treatment mechanics and materials introduced with different benefits. This choice is usually affected by patient age, type and severity of malocclusion, patient cooperation and socioeconomic status; however, the main factor is always the individual preference of the orthodontist.

Today, it is almost impossible to reach definite and complete information about changing tendencies in orthodontics. A review of the literature shows that research on this subject is limited and no such study has ever been conducted in Turkey. Although a study conducted by Moss to evaluate European Orthodontics in 1992 gives a few results about Turkey, it is not possible to say that this study covers the whole Turkish orthodontist population (2).

The aim of this study was 1) to outline a clear portrait of current orthodontic practice in Turkey, 2) to interpret yielded factors that affect the preferences of Turkish orthodontists, 3) to contribute improvement and progress of orthodontics by detecting any possible deficiencies in Turkish orthodontics and, 4) to constitute a reference for the future national surveys to make possible the evaluation of changes in Turkish orthodontics.

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MATERIALS and METHODS

The survey included 225 orthodontists who are members of the Turkish Orthodontic Society.

The questionnaire consisted of six pages. The participants were asked personal questions about their age, gender, city of practice, institute of orthodontic education, years in the practice, number of their active patients and preferred appointment period in the introduction section. Seven main sections with a total of 45 questions followed this section. These sections and corresponding number of questions were as follows; 1. Diagnostic records (7 questions), 2. Fixed appliance therapy (14 questions), 3. Functional extra and intraoral appliances (8 questions), 4. Finishing and retention (3 questions), 5. Surgical orthodontic treatment (4 questions), 6. Clefts of the lip and palate (4 questions), 7. Temporomandibular joint (5 questions).

Each question was given choices. An alternative "other" choice was added and was requested to be explained in case of being checked. "Never", "sometimes", "often" and "always" choices were given to determine frequency when indicated. Check boxes accompanied each choice. It was stated in the questionnaire that multiple choices were allowed and unchecked questions will be evaluated as "never".

The questionnaires were mailed to 225 orthodontists in November 1999. Mailed questionnaires were attached an informative letter and a prepaid return envelope with printed return address on it.

Frequency responses, unless otherwise stated, were given as a percentage of those respondents who replied to a particular question (i.e., the valid response) and not as a percentage of the whole sample. As there is some crossover of response to certain questions, with respondents possibly replying to more than one part of a question, percentages will not always total 100%.

Total of "sometimes", "often", "always", alternatives and their percentages were also presented to determine the frequency of a particular statement.

RESULTS

Of the 225 questionnaires, 122 were returned to our center by February 2000 and were included in the study. Total response rate was 54.2%. Responses in these forms were transferred to computer via database software, percentages were calculated for each answer and descriptive statistics were performed where indicated.

General Information

The median age for the participating orthodontists was 36. Distribution of gender was 51.3% males and 48.7%

females (Figure 1). Average number of patients per orthodontists was 136.

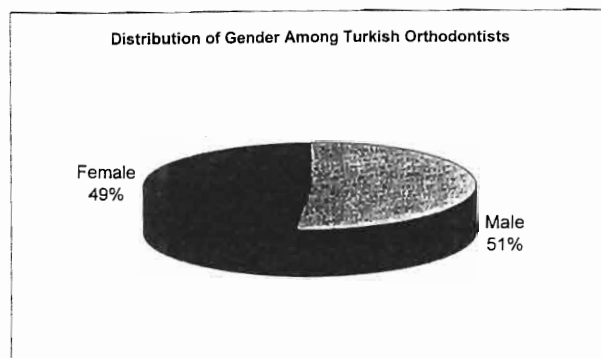


Figure 1 Distribution of gender among Turkish orthodontists.

80.9% of the participants preferred 3-4 week intervals for routine appointments.

Diagnostic Records

Most popular pre and post-treatment radiographic records were panoramic and lateral cephalometric films respectively. The favorite method for extra and intraoral photographic records was color slides. Study casts were prepared by vast majority of the participants. Diagnostic records except slides were taken more commonly prior to treatment.

Majority of the orthodontists were using more than one cephalometric analysis. The most popular analysis however, was Steiner followed by Ricketts, Holdaway, Tweed and McNamara. The use of these four were much more lower than Steiner.

About 90% of the respondents performed manual tracing while 29.5% used digitizing and 8.2% transferred the film directly to computer by scanning.

Most popular cast analysis was Bolton and Hayes Nance. Their rates were very close to each other while most participants preferred using both.

Fixed Appliance Therapy

This survey confirms the preadjusted edgewise mechanism as the appliance of choice for the substantial majority of orthodontic specialists in Turkey. Roth, Bioprogressive, and Alexander techniques were favorite prescriptions respectively (Table 1). 94.3% of the orthodontists were trained for the preferred technique in post-graduate programs, 37.7% in private courses and 9% by different publications.

Every practice reported using metal brackets. Their second preference was ceramic brackets. However, most of

the orthodontists that used ceramic brackets used them only "sometimes". The favorite slot size was 0.018-inch used by 85.1% of the orthodontists. Only 8.3% used 0.022-inch size slots while 6.6 % used both.

Table 1 Favorite techniques of fixed treatment

Techniques	Total	
	Number	%
Andrews	10	8.2
Alexander	28	23.0
Begg	20	16.4
Bioprogressive	48	39.3
Burstone	16	13.1
Creekmore	0	0.0
Hasund	4	3.3
Hilgers	3	2.5
Lightwire	16	13.1
Lingual	12	9.8
Root	7	5.7
Roth	86	70.5
Standart Edgewise	96	78.7
Tip edge	8	6.6
Tweed	1	0.8
Twin wire	5	4.1
Universal	1	0.8
Other	2	1.6

Recycled brackets were used by 62.3 % of the respondents. Favorite recycling methods are presented in Figure 2.

All orthodontists in Turkey performed direct bonding of brackets while 4.1% of the practitioners used indirect bonding as well. However none of the participants used indirect bonding alone.

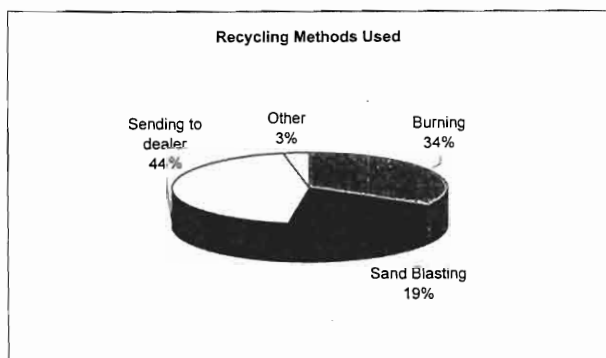


Figure 2 Distribution of favorite bracket recycling methods in Turkey.

Chemically cured no-mix orthodontic adhesives were the most preferred material for bonding by 86% of the respondents. This was followed by light cure, which is nearly one fourth as frequent as no-mix adhesives. All orthodontists used orthophosphoric acid for etching while 2.5% used maleic acid as well. The favorite etching time was 15-30 sec, which was followed by 15 seconds or less.

Most frequently banded teeth were 1st molars, 2nd molars, 2nd premolars, 1st premolars respectively. This order was valid for both arches. The most favorite luting material was glass ionomer cement (GIC). Zinc polycarboxylate and zinc phosphate were also used, however, their frequency was much lower than that of GIC.

The archwire material of choice for vast majority of the specialists was Nickel Titanium (Ni-Ti). Frequency of use of stainless steel archwires was very close to that of Ni-Ti, yet lower. Titanium Molybdenum Alloy (TMA) followed these two, however, only a few orthodontists used TMA "always" (Table 2).

Table 2 Archwire selection

Archwire Material	Total	
	Number	%
Stainless Steel	112	93,3
Multistrand	43	35,8
Cr-Co	56	46,7
TMA	62	51,7
Ni-Ti	119	99,2
Teflon plated	33	27,5
Fiber Optic	5	4,2
Australian	41	34,2
Other	4	3,4

Extraction rate was reported to be 40-60% by 44.1% of the orthodontists. Most commonly extracted teeth were 1st premolars, 2nd premolars and 1st molars respectively. Participants that have checked the "incisor" checkbox have given an explanation of "lower incisor".

Functional, Extra and Intraoral Treatment

Vast majority of the orthodontists (93.4%) stated that they carried out functional treatment. The favorite functional appliance was the Activator, which was followed by Fränkel, Bionator and Jasper Jumper respectively. However use of latter appliances were much lower compared to activator (Table 3).

Cervical headgear, facemask, occipital and combined headgears were orthodontist's favorite extra-oral appli-

ances respectively. Use of "J Hook" headgears was limited. The amount of extra oral force applied was "always" measured by 45.3% of the orthodontists while 9.2% "never" measured and others "often" or "sometimes" did.

Table 3 Functional appliance selection

Appliance	Total Number	%
Activator	97	85,8
Bass	3	2,6
Bionator	43	38
Bimler	0	0
Fränkel	47	41,5
Herbst	8	7
Jasper Jumper	39	34,5
MARS	6	5,3
Twin Block	21	18,5
Magnetic Appliances	4	3,5
Other	9	7,9

Favorite intra-oral molar distalization technique was the use of Ni-Ti open coils (Table 4).

Table 4 Intraoral molar distalization technique selection

Technique	Total Number	%
Ni-Ti Coils	88	73,9
Magnets	0	0
Wilson Arch	19	15,6
Pendulum & Pendex	37	31
Molar Distilizing Bow	8	6,7
K-Loop	1	0,8
Jones Jig	16	13,4

Respondents performed maxillary expansion most frequently by removable plates. Quad-helix, Hyrax and acrylic bonded RME appliances followed this respectively. Use of slow expansion was more common among specialists (Table 5).

Table 5 Maxillary expansion appliance selection

Appliance	Total Number	%
Removable Plates	99	83,1
Quad-Helix	91	76,4
Palatal Bar	40	33,6
Haas	22	18,4
Hyrax	85	71,4
Acrylic Bonded Splint	51	42,8
Other	5	4,2

Finishing and Retention

Favorite applications for finishing were stripping and use of zigzag elastics. The appliance of choice for retention was a Hawley retainer. Most preferred retention period was 1 to 2 years.

Surgical Orthodontic Treatment

Hardly half of the participants performed surgical orthodontic treatment. Mean number of surgery cases was 1-5 Per year (Table 6). A multidisciplinary team carried out this procedure for with most of the participants. Orthodontists preferred working with plastic surgeons and oral surgeons respectively.

Table 6 Average number of surgery patients per year

Number of patients per year	Total Number	%
None	59	49,2
1-5	42	35
5-15	11	9,2
> 15	8	6,7

Clefts of the Lip and Palate (CLP)

CLP patients were included in the patient group of 62.8% of the respondents. Their number of patients Per year is presented in Table 7. Multidisciplinary team approach was adopted for these patients as well. Specialists contributed to the team were plastic surgeons, speech therapists, ENT specialists and oral surgeons. These patients were treated mostly in the infancy, mixed dentition or permanent dentition periods. Intervention in the primary dentition was limited.

Table 7 Average number of cleft lip&palate patients per year

Number of patients per year	Total Number	%
None	9	10,1
1-5	33	37,1
5-15	14	15,7
> 15	33	37,1

Temporomandibular Joint (TMJ)

Nearly half of the orthodontists stated that they see patients with TMJ complaints. Average number of TMJ patients Per year was between 1-5 for most of the respondents, while 23.7% treated more than 15 TMJ patients Per year (Table 8). Favorite diagnostic tools for TMJ concerns were patient history and clinical examina-

tion. Clinical examination mostly included the assessment of maximum mouth opening, deviation in opening, muscle palpation and deflections. The least common diagnostic tool was the auscultation of TMJ. Occlusion was believed to be the major etiologic factor of temporomandibular joint disorder (TMD) by most of the orthodontists. Emotional stress, trauma and combined factors followed this respectively. Favorite treatment modalities were use of functional appliances and occlusal adjustments. Uses of various medications and splint therapy were also carried out to resolve TMD complaints. Anterior repositioning and stabilization splints were almost as common as each other and were mostly constructed for the upper jaw.

Table 8 Average number of TMD patients per year

Number of patients per year	Total Number	%
None	12	15,8
1-5	34	44,7
5-15	12	15,8
> 15	18	23,7

DISCUSSION

The objective of this study was to assemble data on a wide range of issues that would help to give a clear picture of the current trends in Turkish orthodontics to be able to compare this data with results of other countries.

Surveys can be carried out by personal interviews, phone calls or by mailed questionnaires. The use of a questionnaire has both advantages and disadvantages. Advantages include efficiency in measuring simple characteristics of large populations, access to special interest groups with high concern for the subject matter, relatively low cost, and freedom from possible interview bias as the questionnaire is being completed. Major disadvantages are the potential for an inadequate response rate and non-response bias. With a return rate of 54.2%, the present study exceeds that of most questionnaires. Other limitations of a questionnaire study include the impossibility of determining whether respondents were entirely accurate, and also the subjective nature of some responses (for example, routinely versus occasionally) (3). Notwithstanding the disadvantages of questionnaire use, it is a widely used method of gathering information and the nature and distribution of a population may lend itself to no better method of research. Discussion of the results centers on the following issues;

General Information

The mean age for the participating orthodontists was 36. Distribution of gender was 51.3% males and 48.7%

females. It is clear that the male/female ratio of orthodontists is almost equal. The same ratio for female orthodontist in the United States was reported to be 4.5% in 1990 and 6.4% in 1996. (4,5)

Diagnostic Records

Most commonly used films were panoramic graphies and lateral cephalograms. This finding is in accordance with Tyndall and Turner (6) , Atchinson et al. (7) and Gottlieb et al.. (5)

All radiographic records were taken more commonly prior to treatment. Frequencies of post treatment records were lower than pre-treatment and higher than progress records. The orthodontists pay much more attention to the pretreatment records possibly due to medico-legal reasons.

Use of computerized tomography (CT) and magnetic resonance imaging (MRI) were uncommon among orthodontists, MRI being slightly higher than CT. This can be related to unneccessity of this imaging methods for rouine use, high cost and unfamiliarity of orthodontists to these two techniques.

Almost all respondents prepared study casts. Most orthodontist prepared study casts "always" in the beginning and "sometimes" in the progress of treatment.

Use of color slides for patient records were more common than other techniques such as standard 35mm or digital imaging. Taking intra and extraoral slides were more popular ("always") prior and post to treatment while intraoral views were preferred in the progress. We believe that use of digital imaging will increase significantly in the following years parallel to the increased quality and decreased cost of these units.

Different combinations of cephalometric analysis were utilized by most of the respondents. The favorite analysis, however, was Steiner. Cephalometric tracings and measurements were carried out manually by almost all of the orthodontists (91.8%). Digitizing and direct transfer of films to computer media were very limited. Younger orthodontists and newly graduates preferred digitizing to manual tracing. This indicates that most orthodontists do not easily change what they practiced in their own training.

Hayes Nance and Bolton cast analysis were used commonly and together.

Fixed Appliance Therapy

This survey confirms the popularity of the preadjusted appliance. This is in accordance with the global trend.

The favorite prescription of the Turkish orthodontists was that of Roth's.

All respondents reported using metal brackets, but ceramic and plastic brackets were also used in a very limited manner. Their frequency of use was stated as "sometimes" possibly due to higher cost and problems with the use of esthetic brackets. We believe that use of esthetic brackets will increase in the near future as Turkish orthodontists started seeing more adult patients.

Notwithstanding some disadvantages, recycling used brackets were very popular in Turkey. This frequency was reported as being 47.5% in England (8) and 24.8% in United States. (9) The same rate was 62.3% in Turkey.

This survey confirms direct bonding as the choice of substantial majority of orthodontic specialists. Indirect technique advocated by less chair-time, better bracket positioning and better adhesion was less preferred. This is possibly due to the respondents' unfamiliarity with this technique.

Ni-Ti archwires present higher springback and elasticity that provides less chair-time, less archwire change, faster and efficient leveling and rotation correction. The poor formability of these wires implies that they are best suited for preadjusted systems. (10,11) In accordance with these, Turkish orthodontists preferred Ni-Ti archwires with preadjusted appliances.

Rate of extraction cases implies that there is tendency towards non-extraction treatment. This finding is in accordance with the current global non-extraction trend in orthodontics. This implies that people now like more fuller profiles and orthodontist prefer treating to the face rather than the cast itself.

Functional, Intra and Extraoral Appliances

Despite the continuing bias, use of functional appliances was very common among Turkish orthodontists. The favorite functional appliance was the Activator. European notion of functional treatment is still strong in Turkey.

Extraoral appliances were used in varying frequencies with cervical headgear leading. This implies that the Turkish orthodontists do not face much compliance problems with their patients. Despite the popularity of extraoral appliances intraoral molar distalization techniques were also widely accepted. However, simple approaches such as Ni-Ti open coil springs were preferred to specific appliance designs.

Finishing and Retention

Zigzag elastics were used "always" for finishing. Hawley retainer was the far most popular retention appliance. However, there was a tendency towards bonded lingual retainers for the lower anterior.

Surgical Orthodontic Treatment, CLP, TMJ

Only half of the orthodontists deal with these multidisciplinary procedures. Rates found in this survey were lower than those of similar studies were carried out in other countries. We hope that these rates may go up if emphasis on these particular subjects could be increased in the orthodontic education curriculum. It is clear that orthodontist do not like working on hard and long cases like these in the private practice and prefer referring these cases to other bigger medical centers such as university hospitals.

CONCLUSION

This study gives us a clear picture of the current trends in Turkish orthodontics.

Routine repetition of this survey will make possible the evaluation of changes in trends of Turkish orthodontics and comparison of these with other countries. We believe that this study will serve as an important base for this purpose and will contribute to the progress of the specialty by evaluation of results of continuing surveys.

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