TITLE:
“INDICES USED IN ORTHODONTICS”

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ABSTRACT
Orthodontic indices are vital in the assessment of severity, complexity and treatment outcome of malocclusion. Moreover, they are useful in the evaluation of treatment need, funding for treatment cost and public health aspects of orthodontic treatment. The present article reviews the commonly used orthodontic indices for clinical and epidemiologic purposes. The article attempts to classify the indices in qualitative and quantitative methods based on the description given by the respective authors.

KEYWORDS: Orthodontic Indices, Malocclusion, Treatment Outcome
INTRODUCTION

Conditions need to be measured and evaluated based on scientific principles for epidemiological methods of study. A suitable and a practicable method must be developed for recording the occurrence and severity of disease. Quantitative measurement of disease mainly relies on index.

Index is a numerical value that describes the status of group on a scale which has upper & lower limits when compared with the group under the same conditions.

In orthodontics, index is mainly used to rate and categorize by assigning a numerical score or an alphabetic label to person’s occlusion.

Several indices have been developed for dental disorders categorization for research and to categorize the patients based on the treatment needed. (Valiathan, 1997).¹

IDEAL REQUIREMENTS FOR INDEX²

1. Simple & Clear
   Index should be easy to apply, and the criteria should be easy and simple

2. Validity
   Index should measure what it is intended to measure and reflect the clinical stage of the disease.

3. Reliability (reproducibility)
   There should consistency in the measurement at different times and conditions.

4. Acceptability
   Use of index should not be painful or demeaning to the subject

5. Quantifiable/Measurable
   It should be measurable so that it can be subjected to analysis.

6. Sensitive
TYPES OF INDICES

There are 5 types of indices. Each one of them is differentiated by a purpose rather than content or conventions.

1. Diagnostic classification
This type of classification allows ease of communication between orthodontists.
An example of this would be Angle’s classification which is used to describe the relation of incisor and buccal segment.

2. Epidemiologic indices
An example of this is the Summer’s occlusal index. In this, all malocclusion trait is recorded for estimating the prevalence of it in each population.

3. Treatment need indices
Categorization of malocclusion is done based on the level of treatment needed. Ex: Grainger's treatment priority index, Dental aesthetic index

4. Treatment outcome indices
Example of this is the PAR index where the outcome of treatment is assessed.

5. Treatment complexity Index
Complexity, Outcome and Need.

INDICES USED IN ORTHODONTICS

A) IOTN - INDEX OF ORTHODONTIC TREATMENT NEED
Assessment from anatomic & aesthetic perspective was proposed by BROOK AND SHAW in 1989.
It mainly has of 2 components: Dental health & Aesthetic component
Dental health component: This has 5 grade categorizations from 1 which suggests that no treatment is need to 5 which suggests that there is great need for treatment. Evaluation is based on 5 occlusal traits:
1. Overjet
2. Missing teeth
3. Contact point displacement
4. Crossbite
5. Overbite

Series of letters is given to each grade to identify the trait for epidemiological purposes. (Peter H. Brook). In this type of categorization the scores for individual traits are not summed.\(^4\)

**AESTHETIC COMPONENT:**\(^5\)
In this, one of the photographs by an orthodontist is matched with the dental appearance of the patient. From a sample of 1000 photographs of age group of 12 yr. old, 10 photographs were selected. Selection was done based on the attractiveness ratings of six non dental judges. The selected photographs are then rated or arranged from “most attractive” (number 1), “least attractive” (number 10). Rating is then done based for ‘overall dental attractiveness’. Final value then determines the treatment needed based on the aesthetic impairment. This score obtained was approved by dentists, parents & children. Parents & children found it simple and easy to apply.

Reliability
Brook & Shaw suggested that IOTN dental health component was less error prone and gave consistent results in an ideal clinic setting and for esthetic component, it was when child is rated for esthetic impairment. (Peter H. Brook). However, Buchanan found it otherwise suggesting that there were discrepancies for the esthetic component scores from photos in comparison to scores recorded clinically/models. (Buchanan).\(^2\)

**Modification in IOTN**
To improve the reliability in 1993 an alternative was proposed in the aesthetic (AC) and dental health component (DHC). Dental health component (DHC) - It was suggested to lower the 5 grades to 3. It was accepted as British standards for orthodontic treatment. No treatment needed (Grade II), borderline (Grade III) and definite need(Grade IV). In the aesthetic component (AC), it was suggested to change from 10-point scale to 3 point. (Table 1)
In 2001, DHC was reduced to 0 and 1. 0 meant no need and 1 meant definite need. In AC record of malocclusions with aesthetic and definite dental health is done. Johansson & Follin (EJO, 2005) assessed from their study which included 272 orthodontists that the most of the Sweden orthodontists were in consent with the photograph ranking in the IOTN aesthetic component and its treatment need classification. Regarding need for treatment photographs 1-4 - no need for treatment, need for treatment for photographs 5 and 7-10 and 6- borderline.

<table>
<thead>
<tr>
<th>Photographs</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>no need for treatment</td>
</tr>
<tr>
<td>5-7</td>
<td>Borderline need</td>
</tr>
<tr>
<td>8-10</td>
<td>Definitive need</td>
</tr>
</tbody>
</table>

B) **PEER ASSESSMENT RATING INDEX - PAR INDEX**

By R. Jones, C.D. Stephens, Richmond, W.C. SHAW, O'BRIEN, Buchanan, C.T. Roberts & M. Andrews proposed this in 1992. Over 200 dental casts were examined & discussed to determine which individual features could be used in obtaining an occlusion alignment. Sum of the individual scores are then taken. This represents the degree of deviation of the case from occlusion and normal alignment. 0 means good alignment and higher scores suggests increased irregularity levels. Scores are then recorded on dental casts and the difference is taken to see how much has improved as a result of treatment.

Following are the 11 PAR index components:

- Lower and Upper Right Segment
- Lower and Upper anterior segment
- Right and Left Buccal Occlusion
- Upper and Lower left segment
- Overbite
- Overjet
- Centre line
Measured done based on crowding, spacing and impacted teeth. Displacements are then calculated except for the first, second and the third molar. When the displacement is greater the PAR score will be higher. (Table 2)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Impacted teeth</td>
</tr>
<tr>
<td>4</td>
<td>&gt; 8mm</td>
</tr>
<tr>
<td>3</td>
<td>4.1-8mm</td>
</tr>
<tr>
<td>2</td>
<td>2.1mm-4mm</td>
</tr>
<tr>
<td>1</td>
<td>1.1-2mm</td>
</tr>
<tr>
<td>0</td>
<td>0-1mm</td>
</tr>
</tbody>
</table>

Buccal occlusion: Is scored with respect to 3 planes:

- Antero posterior plane (Table 3)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>½ unit</td>
</tr>
<tr>
<td>1</td>
<td>&lt; ½ unit</td>
</tr>
<tr>
<td>0</td>
<td>Class I, II, III Good inter digitation</td>
</tr>
</tbody>
</table>

Vertical plane (Table 4)
<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lateral open bite on &gt;= 2mm</td>
</tr>
<tr>
<td>0</td>
<td>No intercuspation discrepancy</td>
</tr>
</tbody>
</table>

Transverse plane (Table 5)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>&gt; 1 tooth in scissor bite</td>
</tr>
<tr>
<td>3</td>
<td>&gt; 1 tooth in cross bite</td>
</tr>
<tr>
<td>2</td>
<td>1 in cross bite</td>
</tr>
<tr>
<td>1</td>
<td>Tendency - Cross bite</td>
</tr>
<tr>
<td>0</td>
<td>No cross bite</td>
</tr>
</tbody>
</table>

Anterior cross bite (Table 6)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>&gt; 2 teeth in crossbite</td>
</tr>
<tr>
<td>3</td>
<td>2 teeth in crossbite</td>
</tr>
<tr>
<td>2</td>
<td>1 single tooth in crossbite</td>
</tr>
<tr>
<td>1</td>
<td>&gt;=1 in edge to edge</td>
</tr>
<tr>
<td>0</td>
<td>No discrepancy</td>
</tr>
</tbody>
</table>

Overbite (Table 7)
<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>&gt;= full tooth covering</td>
</tr>
<tr>
<td>2</td>
<td>&gt; 2/3 coverage</td>
</tr>
<tr>
<td>1</td>
<td>&gt; 1/3 but &lt; 2/3</td>
</tr>
<tr>
<td>0</td>
<td>&lt;= 1/3 covering of lower incisor</td>
</tr>
</tbody>
</table>

Open bite (Table 8)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Open bite more than/equal to 4mm</td>
</tr>
<tr>
<td>3</td>
<td>Open bite 2.1 to 3mm</td>
</tr>
<tr>
<td>2</td>
<td>Open bite 1.1 to 2mm</td>
</tr>
<tr>
<td>1</td>
<td>Open less than/equal to 1mm</td>
</tr>
<tr>
<td>0</td>
<td>No open bite</td>
</tr>
</tbody>
</table>

Centreline: (Table 9)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>DISCREPANCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>&gt; ½ lower incisor width</td>
</tr>
<tr>
<td>1</td>
<td>¼ - ½ lower incisor width</td>
</tr>
<tr>
<td>0</td>
<td>Up to 1 1/4 lower incisor width.</td>
</tr>
</tbody>
</table>

Reliability

Correlation coefficient of reliability based on PAR scores of 38 cases:
0.95 - Intra examiner reliability and 0.91 for Inter examiner reliability.
Validation

Pre & post treatment PAR scores were calculated by 74 dentists. Mean weightings were derived and average of these were taken.

In 1995, Deguzmann et al. suggested an American index version. (Table 10)

<table>
<thead>
<tr>
<th>Variability</th>
<th>Weighting - British</th>
<th>Weighting - America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overbite</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Occlusion - Buccal</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Overjet</td>
<td>6</td>
<td>4.5</td>
</tr>
<tr>
<td>Buccal alignment</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lower anterior alignment</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Midline</td>
<td>4</td>
<td>3.5</td>
</tr>
<tr>
<td>Upper anterior alignment</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Results of the treatment was categorized into:

A) Greatly improved - &ge; 50% reduction in score and 22 points reduction in PAR index
B) Improved - &lt; than 22 points reduction, &ge; 30% PAR score reduction.
C) Worse/No different – &lt; 30% change in score.

Higher standard criteria for treatment was proposed by Richmond & Shaw (EJO 1992).
1) &ge; 70% mean % reduction in weighted PAR score
2) &lt; 5% cases in category - worse/no different.

From studies by V. Ravinder, Ashima Valiathan, it showed that out of the 100 pre & post treatment casts, most of cases fell into the greatly improved category.

Modification

Hamdan & Rock (EJO 1999), from his study showed that PAR index cannot be applied in the same way to all categories of malocclusion because of difference in the occlusal features in various classes of malocclusion and hence proposed a new weighting system.8

Drawback
1. Lack of sensitivity to finished case details.
2. No consideration for limited treatment cases.
3. No considerations for decalcification etc.
4. Inclination, inappropriate expansion & treatment are not evaluated.
5. Lack of consideration for changes in soft tissue.

C) HANDICAPPING MALOCCLUSION ASSESSMENT RATING

Conditions that are hazardous to the oral health maintenance & interfere a child’s wellbeing by affecting dentofacial esthetics, speech and mandibular function is termed as Handicapping malocclusion & handicapping dentofacial deformity.

In 1967, Salzmann developed a new rating system to assess which child should be given higher priority for treatment.

Severity is assessed by the score obtained in assessing the dental casts for malocclusion. Diagnosis, planning and treatment complexity are not taken into consideration for the assessment.

A cut off score is set that will enable the patient for treatment by the community professionals. Funds allocated to orthodontics are also taken into consideration.

Children with the highest scores are given priority for treatment followed by children with lesser scores but still above the set cut off limit.

SCORING

Each deviated tooth – 2points
Canines & posterior teeth deviation - 1 point Deviation of all mandibular teeth – 1

Depending on the effects on dental health and the facial appearance, points are assigned to the deviations. The index is then used to evaluate intra-arch and inter-arch deviations.

Intra-arch deviations:

Assessment:
Using mirror, the model is studied with teeth facing upward. anterior segment of maxilla deviation– 2 points
anterior segment of mandible deviation – 1 point. Missing teeth - 1 point
Crowded teeth: Positional irregularities interrupting dental arch with space deficiency - 1 point
Rotated teeth: Positional irregularities of crowns interrupting arch with no space deficiency –1 point
Open spacing: Separation of incisor tooth that results in visibility of the interdental gingiva –1 point
Closed spacing: Space closure that will not allow fully eruption. – 1 point

Inter-arch deviation:
Assessment is done intra orally.
Anterior segment: Overbite, Overjet, crossbite and incisors Open bite. Posterior segment: Crossbite, Open bite & antero-posterior deviation. Antero-posterior deviation:
Assessment of any dentofacial deformity is done. Speech defects are recorded only when appropriate professions give an assessment that the subject has speech defect. Special training in speech pathology is needed for an orthodontist to do the assessment.
For first molars deviation is recorded when it extends a full cusp width and for premolars. It is also recorded when the premolars and canines occlude (interproximal area)
For each deviated tooth 1 point is assigned.

Total HMAR score:
Intra-arch, inter-arch and anterior Posterior scores are summed.
Intra and inter arch score >= 6 , 8 points are then added which suggests dentofacial deviation.

D) ORTHODONTIC TREATMENT PRIORITY INDEX (TPI).10
As suggested by R M Grainger in 1967, all components are measured from positive to negative value.
Weighted sub scores are used for describing:
1.Overjet – Distance (Anterior) from opposing surface(labial) of mandibular incisor to surface(labial) of maxillary CI (mesial part).
2.Overbite or open bite –Overlap - maxillary on mandibular CI (central incisor).
3.Tooth displacement - Number of teeth displaced from normal alignment + 2 * number of teeth rotated > 45º / displaced > 2mm.
4.posterior crossbites
Summary scores are used to assess the overall malocclusion severity. Seven syndromes quantify oral inter-relationships.

1. Incisor relationship horizontally - underjet, overjet
2. Incisor relationship vertically - overbite, open bite
3. The occlusion of the buccal segments - posterior crossbite
4. Tooth displacement - rotation and crowding

Total TPI scores range from 0 to 10 or more. Higher the score, more is the severity of the malocclusion.

Scoring (Table 11)

<table>
<thead>
<tr>
<th>Score</th>
<th>Treatment needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>No</td>
</tr>
<tr>
<td>2-3</td>
<td>Minimal</td>
</tr>
<tr>
<td>4-6</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;6</td>
<td>Definite</td>
</tr>
</tbody>
</table>

E) HANDICAPPING LABIO-LINGUAL DEVIATION INDEX

As suggested by Harry Draker, subjects with severe malocclusion & dento-facial anomalies were selected. Boley gauge was chosen as the measuring device. Measurements are taken in mm.

The main idea was to determine the presence/absence of anomalies and also the extent of deformity/handicap caused by the following components.

Components:

1. Cleft Palate:
   Malocclusions that result from serious deformities that involves mandible and maxilla development.

2. Traumatic deviation:
   Loss due to serious accidents or burns like the loss of premaxilla segment.

3. Overjet:
   Patient is the central focus of measurement. Measurement is applied to single tooth protruding or whole arch.
4. Overbite: Measured to nearest mm

5. Mandibular Protrusion:
Measurement taken from upper to lower incisor labial.

6. Open bite: Absence of occlusal contact in the anterior.

7. Labio-lingual spread:
Distance from most protruded to lingually displaced anterior.
Scores $\geq 13$ means ‘physical handicap’.

F) OBJECTIVE GRADING SYSTEM

American Board of Orthodontics began to see if there is a more objective way of making the phase III examination. In 1994, they began testing methods to evaluate post treatment dental casts and panoramic radiographs.
PAR index measuring system is reliable to some extent. It is not effective enough to differentiate between the minor inadequacies of tooth position. Hence a different scoring system was developed for these cases.
First field test (1995):
Cases evaluated – 100 Criteria measured - 15
Result: Majority (85%) of the inadequacies occurred in 7 criteria.

1. Alignment
2. Marginal Ridges
3. Buccolinguial inclination
4. Overjet
5. Occlusal Relationships
6. Occlusal Contacts
7. Root Angulation

Second field test (1996):
300 cases were evaluated to verify previous test results. It also evaluated to see if examiners need to be involved so that the reliability of the process can be improved.
Result: Inadequacies in the same criteria as before.
Third field test (1997):
A new instrument was used for measuring and 832 samples were evaluated.
Fourth & Final test (1998):
New & improved measuring instrument was used. Everyone involved went through extensive training and calibration.
Based on the results the Objective Grading System was finally initiated in 1999. Eight criteria for Scoring

1. Alignment
Incisal edges and lingual surfaces of the maxillary anterior teeth and incisal and labial- incisal surfaces of the mandibular anterior teeth. Most common mistake was in the maxillary and mandibular lateral incisors and second molars.
2. Buccolingual inclination
Difference between the heights of the buccal and lingual cusps of the maxillary and mandibular molars and premolars are minimized
3. Marginal ridges:
Marginal ridges are used to assess proper vertical positioning of the posterior teeth. Most common mistake was in the maxillary first and second molars.
4. Occlusal relationships
Assess the relative anteroposterior position of the maxillary and mandibular posterior teeth. Most reliable way to measure this is by using Angle’s relationship.
5. Occlusal Contacts:
Functioning cusps are used to assess the adequacy of this criterion. If the cusp form is small or diminutive, that cusp is not scored.
6. Overjet
Assess the relative transverse relationship of posterior teeth and the anteroposterior relationship of the anterior teeth.
7. Interproximal contacts
Determine if all spaces within the dental arch have been closed.
8. Root angulation
Assess how well the roots of the teeth have been positioned relative to one another.
GUIDE FOR GRADING CLINICAL CASE REPORTS

Alignment: (Table 12)

<table>
<thead>
<tr>
<th>Deviation</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 0.50 mm of proper alignment</td>
<td>0</td>
</tr>
<tr>
<td>0.50 mm to 1 mm</td>
<td>1 for each tooth</td>
</tr>
<tr>
<td>&gt;1 mm</td>
<td>2 for each tooth</td>
</tr>
</tbody>
</table>

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 64 to get the alignment score.

Marginal ridges: (Table 13)

<table>
<thead>
<tr>
<th>Marginal ridge deviation</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.50 mm to 1 mm</td>
<td>1 for interproximal contact</td>
</tr>
<tr>
<td>&gt;1 mm</td>
<td>2 for interproximal contact</td>
</tr>
</tbody>
</table>

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 32 to get the marginal ridges score.

Buccolingual inclination: Flat surface is used. It is then extended between the right and left posterior teeth occlusal surfaces. In the maxillary arch, the straight edge should contact the lingual cusps of the maxillary molars and premolars. The buccal cusps should be within 1 mm of the surface of the straight edge. (Table 14)

<table>
<thead>
<tr>
<th>Mandibular lingual cusps/ maxillary buccal cusps deviation</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2 mm</td>
<td>2 for that tooth</td>
</tr>
<tr>
<td>&gt;1 mm but &lt; 2 mm</td>
<td>1 for that tooth</td>
</tr>
</tbody>
</table>
Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 40 to get posterior inclination.

Occlusal contacts: (Table 15)

<table>
<thead>
<tr>
<th>Cusp Deviation</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>In contact with opposing arch</td>
<td>0</td>
</tr>
<tr>
<td>&lt;= 1mm</td>
<td>1 for that tooth</td>
</tr>
<tr>
<td>&gt;1mm</td>
<td>2 for that tooth</td>
</tr>
</tbody>
</table>

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 64 to get posterior occlusal contacts.

Occlusal relationship: (Table 16)

<table>
<thead>
<tr>
<th>Maxillary buccal cusps deviate</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2mm</td>
<td>2 for each tooth</td>
</tr>
<tr>
<td>Between 1mm – 2mm</td>
<td>1 for that tooth</td>
</tr>
</tbody>
</table>

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 24 to get occlusal relationships.

Overjet: (Table 17)

<table>
<thead>
<tr>
<th>Mandibular buccal cusps deviate</th>
<th>Points to be subtracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1mm</td>
<td>1 for that tooth</td>
</tr>
<tr>
<td>&gt;1mm from center of opposing tooth</td>
<td>2 for each tooth</td>
</tr>
</tbody>
</table>

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 32 to get overjet.

Interproximal contacts: (Table 18)
Interproximal spaces | Points to be subtracted
--- | ---
None | 0
<=1mm | 1
>1mm from center of opposing tooth | 2

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 60 to get interproximal contacts.

**Radiographic Analysis**

Root angulation (Table 19)

Deviation of apex | Points to be subtracted
--- | ---
<=1mm | 0
>1mm but < 2mm | 1
>2mm | 2

Maximum points to be subtracted is 2 points. Total of the deductions are subtracted from 64 to get root angulation.

**G) INDEX OF COMPLEXITY OUTCOME & NEED (ICON)\textsuperscript{13}**

Proposed by Charles Daniels, Stephen Richmond (2000). Number of samples: 240 dental casts were assessed for treatment need and 98 paired pre & post treatment cases were assessed for treatment outcome. It was then evaluated using 5 point scale.

Occlusal Traits Scored Include:
1. Alignment of upper and lower labial segment
2. Anterior Vertical Relationship
3. Centreline
4. Impacted Teeth
5. Upper and Lower buccal segment alignment
6. Buccal Segment antero-posterior Relationship, vertical relationship (left and right added together)
7. Cross bite
8. Missing Teeth for any reason
Average of 2 for each occlusal trait weighting is taken to get a single set of weighting which then forms a new index of treatment need and assesses the outcome.

- Dental aesthetics:

Graded from 1 to 10, 1 being most attractive and 10 being less attractive. Score is then multiplied by weighting of 7.

- Cross bite:
  - Posterior / anterior segment crossbite or both = Score - 1 * weighting of 5.
  - Anterior - Vertical Relationship: Open bite, overbite
  - Upper arch crowding / spacing - Impacted tooth scores maximum for crowding.

Initial score is multiplied by 5. All variable scores are obtained and then multiplies with weights. Sum of them is taken to get a final score.

Treatment complexity is assessed using a 5 point system. Ranges from simple to very difficult. Percentage improvement can also be calculated by comparing pre & post treatment.

Advantages –
1) Simple to use as there are few measurable traits.
2) Common measurements. Hence learning curve is small.
3) Resolved treatment need & outcome classifications conflicts.
4) Quick to use.
5) No additional measurement tools needed.

H) ADHESIVE REMNANT INDEX

Artun and Bergland (AJO 1984) which is used to evaluate the amount of adhesive left on the tooth after debonding. (Table 20)

<table>
<thead>
<tr>
<th>Score</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>All adhesives left on the tooth with bracket mesh impression.</td>
</tr>
<tr>
<td>2</td>
<td>More than half of the adhesive left</td>
</tr>
<tr>
<td>1</td>
<td>Less than half of the adhesive left</td>
</tr>
<tr>
<td>0</td>
<td>No adhesive left on the tooth</td>
</tr>
</tbody>
</table>
CONCLUSION:
Although occlusal indices are used in connection with public health orthodontic programs in some states, their adoption in everyday practice is extremely limited. With the use of indices in orthodontics, there is now a more uniform way of interpreting and applying the above-mentioned criteria for treatment need. There is still need for improvement. There must be a universally accepted index which is both valid and reliable. Improvements in diagnostic criteria must be done & there is a need for developing a common approach for assessing treatment need.

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