Expert Consensus on the Evaluation of Orthodontic Treatment Outcomes

Chinese Stomatological Association Group Standards T/CHSA 100-2025, Committee of Orthodontics, Chinese Stomatological Association[1]

To overcome the reliance on subjective clinical judgment and the inadequacy of international indices in reflecting Chinese orthodontic expertise and patient characteristics, the Chinese Stomatological Association developed an expert consensus on orthodontic treatment outcome evaluation. This first systematically calibrated framework tailored to Chinese populations was established through an extensive process: comprehensive literature review, analysis of the Peer Assessment Rating (PAR) and the American Board of Orthodontics Objective Grading System (ABO-OGS) indices and a large-scale subjective-objective correlation study involving 65 standing committee members evaluating 216 completed cases. The resulting 3D evaluation system encompasses occlusal relationships, root and bone health and facial profile harmony. Occlusal assessment includes six core indicators: incisor horizontal overlap, vertical overlap, sagittal relationship, alignment, occlusal contact and buccal lingual inclination. Root and bone health evaluation mandates CBCT-based assessment of root resorption, fenestration and dehiscence, the first mandatory inclusion of 3D radiographic evaluation in orthodontic outcome standards. Facial profile analysis comprises five cephalometric measurements (ANB, MP/SN, Sn-GPos, UL-E and Bs-GPos) evaluated using a standardised difference method. Each dimension provides detailed specifications for evaluation materials, objective indicators, measurement methods, scoring criteria and a five-grade classification (excellent, good, fair, poor and worst) based on total deduction scores aligned with expert consensus percentiles. This consensus aims to standardise clinical practice, establish a scientific foundation for treatment quality control and specialist certification, provide morphological evaluation criteria for research and enhance orthodontic care quality in China. Despite being focused on static morphology, the framework is designed to accommodate future integration of functional assessment and long-term stability evaluation.

Keywords: *cephalometry, expert consensus, occlusal assessment, orthodontics, root resorption, treatment outcome*

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Preface

With the rapid development of the national economy, the significant potential on the demand side of the orthodontic market and the uneven distribution of orthodontic specialist resources have created a pronounced imbalance between supply and demand. To address this challenge, contemporary Chinese orthodontics urgently needs to establish an outcome evaluation system that reflects the consensus of Chinese orthodontic experts. This initiative is essential both for standardising the quality control of orthodontic care and for guiding clinical research and its application. The establishment of such a system aims to regulate the clinical practice of orthodontists, lay a solid foundation for monitoring the quality of orthodontic treatment and implementing a future specialist certification system, and guide clinical practice and scientific research to foster continuous innovation and development in orthodontic technology.

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This document draws upon internationally recognised indices widely used in orthodontics, such as the Peer Assessment Rating (PAR) Index and the American Board of Orthodontics Objective Grading System (ABO-OGS) Index,[1-6] integrates insights from relevant monographs and literature both domestic and international,[7-21] and incorporates the clinical expertise and consensus of all standing committee members of the 8th Committee of Orthodontics, Chinese Stomatological Association. Notably, during its drafting, this document specifically focuses on "morphological" and "static" evaluation dimensions. It aims to form a precise, reliable and effective assessment system dedicated to evaluating the static dentofacial relationships, root and bone health and lateral facial harmony in patients after orthodontic treatment, thereby providing clear morphological evaluation criteria and research references for Chinese orthodontists.[22-34] It is important to emphasise that while this document strives to be comprehensive and thorough in static morphological evaluation, it does not cover "functional" or "dynamic" assessment aspects. Dynamic changes, such as functional recovery and long-term stability after orthodontic treatment, will be discussed and standardised separately. Thus, when applying the recommendations set out in this document, it is essential to consider both morphological and functional dimensions in light of the patient's specific condition to achieve a comprehensive and scientific evaluation of orthodontic outcomes. Additionally, this document is intended for evaluating immediate post-treatment effects. Concerning potential risks to dental and periodontal health due to oral hygiene conditions during orthodontic treatment, orthodontists must systematically provide oral hygiene education and conduct comprehensive oral examinations at each follow-up visit. If any issues are identified, orthodontists should actively collaborate with specialists from other relevant dental disciplines to ensure timely and effective management and resolution of dental and periodontal diseases.

Scope

This document presents expert consensus across five key dimensions for evaluating orthodontic treatment outcomes: evaluation materials, objective indicators, measurement methods, scoring criteria and classification of outcomes. It is applicable to the assessment of the immediate posttreatment effects of orthodontic treatment for patients with permanent dentition malocclusion treated with various types of appliances. Orthodontists and other relevant dental practitioners or dental assistants at all levels of hospitals may refer to this document when evaluating orthodontic treatment outcomes.

This document is not applicable for evaluating early orthodontic interventions or limited orthodontic treatment performed in conjunction with implant or prosthetic rehabilitation.

Normative references

There are no normative references in this document.

Terms and definitions

The following terms and definitions are applicable to this document.

Alignment

The spatial arrangement of teeth within the dental arch, characterised by the coordinated distribution of specific reference points across the anterior and posterior segments.

Note 1: Anterior alignment features include:

- the incisal edges and lingual surfaces of the maxillary anterior teeth;
- the incisal edges and labial surfaces of the mandibular anterior teeth.

Note 2: Posterior alignment features include:

- the mesiodistal central fossae of the maxillary posterior teeth;
- the mesiodistal buccal cusps of the mandibular posterior teeth.

Note 3: Harmonious alignment is demonstrated by these reference points forming a smooth arch curvature.

Buccal-lingual inclination

This refers to the height difference between the mesiobuccal and mesiolingual cusps of the molars and the buccal and lingual cusps of the premolars, relative to a reference plane defined by bilateral occlusal contact points.

Root resorption

Pathological absorption of dental hard tissues under biomechanical influence, specifically referring to external apical root resorption induced by mechanical forces during orthodontic treatment.[35]

Note 1: Orthodontically induced root resorption is an inflammatory-based biological remodelling process in-

volving interactions among the root, alveolar bone and periodontal ligament tissues.
Note 2: This definition primarily applies to idiopathic root resorption caused by orthodontic treatment. Other types of root resorption (e.g., traumatic or pathological) are not included within this assessment scope.

Bone fenestration

A specific type of alveolar bone defect characterised by a localised absence of the buccal or lingual cortical plate, resulting in exposure of the root surface while the cervical portion of the tooth remains supported by intact alveolar bone.[36]

Bone dehiscence

A pathological manifestation of marginal alveolar bone defect, characterised by the vertical loss of the buccal or lingual cortical plate, resulting in continuous exposure of the root surface from the alveolar crest apically.[37]
Note: The primary distinction from "one fenestration" lies in whether the defect involves the alveolar crest margin.

Subspinale-nasion-supramental angle (ANB)

The angle formed by the subspinale point (A), nasion (N) and supramental point (B).
Note: This reflects the sagittal positional relationship between the maxillary and mandibular basal bones.

Mandibular plane to sella-nasion angle (MP/SN)

The anterior inferior angle between the mandibular plane (defined by a tangent line connecting the menton (Me) to the lower border of the mandibular angle) and the sella-nasion plane (SN plane).
Note: This reflects the steepness of the mandibular plane.

Perpendicular distance from subnasale to the glabella-pogonion of the soft tissue line (Sn-GPos)

The perpendicular distance from subnasale (Sn) to the line connecting the glabella (G) and soft tissue pogonion (Pos).
Note: This reflects the prominence of the maxillary soft tissue (at the subnasale region) relative to the anterior facial contour line.

Upper lip protrusion to the aesthetic plane distance (UL-E)

The distance from the upper lip protrusion point (UL) to Ricketts' aesthetic plane (the line connecting the pronasale (Prn) and soft tissue pogonion (Pos)).
Note: This reflects the prominence of the upper lip relative to the nasal and chin profile.

Perpendicular distance from sublabiale to the glabella-pogonion of the soft tissue line (Bs-GPos)

The perpendicular distance from the soft tissue supramental point (Bs, the deepest point of the labiomental sulcus) to the line connecting the glabella (G) and soft tissue pogonion (Pos).
Note: This reflects the prominence of the mandibular soft tissue (at the labiomental sulcus region) relative to the anterior facial contour line.

Evaluation of orthodontic treatment outcomes

Evaluation of occlusal relationships

Evaluation materials

Post-treatment occlusal relationship.

Objective indicators

These include:
- incisor horizontal overlap;
- incisor vertical overlap;
- sagittal occlusal relationship;
- alignment;
- occlusal contact;
- buccal-lingual inclination.

Measurement methods

Incisor overjet

Horizontal overlap or reverse horizontal overlap is measured for the maxillary central incisors. The horizontal distance from the midpoint of the incisal edge of the right and left maxillary central incisors to the labial surface of the opposing mandibular incisor is measured. The maximum value is recorded as the horizontal

Table 1 Scoring criteria for incisor horizontal overlap.

Parameter	Measured value X (mm)	Scoring standard
Horizontal overlap	0 < X < 3.0	0
	3.0 < X < 4.0	−3
	4.0 < X < 5.0	−6
	X > 5.0	−9
Reverse horizontal overlap	X = 0[a]	−4
	−1.0 < X < 0	−6
	X < −1.0	−9

[a]In the case of an edge-to-edge relationship, where the measured horizontal overlap X = 0 mm and vertical overlap X = 0 mm, only 4 points are deducted, and no duplicate scoring is applied.

Table 2 Scoring criteria for incisor vertical overlap.

Parameter	Measured value X/clinical crown height Y	Scoring standard
Vertical overlap	0 < X/Y < 1/3	0
	1/3 < X/Y < 1/2	−2
	½ < X/Y < 2/3	−4
	X/Y > 2/3	−8
Open bite	X = 0 mm[a]	−4
	−1.0 mm ≤ X < 0 mm	−6
	X < −1.0 mm	−8

[a]In the case of an edge-to-edge relationship, where the measured horizontal overlap X = 0 mm and vertical overlap X = 0 mm, only 4 points are deducted, and no duplicate scoring is applied.

overlap (positive value) or reverse horizontal overlap (negative value).

Incisor overbite

Vertical overlap or open bite is measured for the maxillary central incisors. The vertical distance from the midpoint of the incisal edge of the right and left maxillary central incisors to the incisal edge of the opposing mandibular central incisor is measured. The maximum value is recorded as the vertical overlap (positive value) or open bite (negative value). The clinical crown height of the corresponding mandibular central incisor is also measured, and the ratio of vertical overlap to clinical crown height is calculated.

Sagittal occlusal relationship

The sagittal deviation of the first molar and canine from a Class I relationship is measured. For the first molar, the distance from the mesiobuccal cusp of the maxillary first molar to the mesiobuccal groove of the mandibular first molar is measured and recorded separately for the left and right sides. For the canine, the distance from the maxillary canine to the embrasure between the mandibular canine and first premolar is measured and recorded separately for the left and right sides.

In cases where a full Class II or full Class III molar relationship is intentionally achieved due to skeletal discrepancies:

- For a full Class II molar relationship, the distance from the mesiobuccal cusp of the maxillary first molar to the embrasure between the mandibular first premolar and first molar is measured bilaterally.
- For a full Class III molar relationship, the distance from the mesiobuccal cusp of the maxillary first molar to the distobuccal groove of the mandibular first molar is measured bilaterally.

Alignment

In the anterior segment (from the mesial anatomical contact point of one canine to that of the contralateral canine), the shortest distance parallel to the occlusal plane is measured between adjacent anatomical contact points at sites of misalignment. Each site of misalignment is recorded separately.

In the posterior segment (from the mesial anatomical contact point of the first molar to the distal anatomical contact point of the canine), the shortest distance parallel to the occlusal plane is measured between adjacent anatomical contact points at sites of misalignment. Each site of misalignment is recorded separately.

Table 3 Scoring criteria for sagittal occlusal relationship.

Parameter	Measured value X (mm)	w
First molar relationship	0 ≤ X ≤ 2.0	0 per tooth
	2.0 < X ≤ 3.0	−2 per tooth
	X > 3.0	−4 per tooth
Canine relationship	0 ≤ X ≤ 2.0	0 per tooth
	2.0 < X ≤ 3.0	−2 per tooth
	X > 3.0	−4 per tooth

Table 4 Scoring criteria for alignment.

Parameter	Measured value X (mm)	Scoring standard
Anterior segment	0 ≤ X ≤ 0.5	0 per site
	0.5 < X ≤ 1.0	−1 per site
	X > 1.0	−2 per site
Posterior segment	0 ≤ X ≤ 0.5	0 per site
	0.5 < X ≤ 1.0	−1 per site
	X > 1.0	−2 per site

Table 5 Scoring criteria for occlusal contact.

Measured value X (mm)	Scoring standard
X = 0	0 per functional cusp
0 < X ≤ 1.0	−1 per functional cusp
X > 1.0	−2 per functional cusp

Table 6 Scoring criteria for buccal-lingual inclination.

Measured value X (mm)	Scoring standard
0 ≤ X ≤ 1.0	0 per tooth
1.0 < X ≤ 2.0	−1 per tooth
X > 2.0	−2 per tooth

Table 7 Grading classification criteria.

Grade	Description	Total deduction score (S)
Excellent	Within the 5th percentile of normal distribution	S ≤ 10
Good	Between the 5th and 25th percentiles	10 < S ≤ 19
Fair	Between the 25th and 75th percentiles	19 < S ≤ 28
Poor	Between the 75th and 97.5th percentiles	28 < S ≤ 38
Worst	Beyond the 97.5th percentile	S > 38

Occlusal contact

The distance from the functional cusps of the maxillary posterior teeth to the contacting surface of the opposing dentition is measured. This includes one functional lingual cusp of the maxillary premolars and two functional lingual cusps of the maxillary molars (if the distolingual cusp of the molar is diminutive, it is excluded from measurement). Measurements are recorded separately for each functional cusp.

Buccal-lingual inclination

Using the plane passing through the bilateral occlusal contact points as the reference, the height difference between the mesiobuccal and mesiolingual cusps of the molars and between the buccal and lingual cusps of the premolars is measured. Measurements are recorded separately for each tooth.

Scoring criteria

The scoring criteria for incisor horizontal overlap are presented in Table 1, those for incisor vertical overlap in Table 2, those for sagittal occlusal relationship in Table 3, those for alignment in Table 4, those for occlusal contact in Table 5 and those for buccal-lingual inclination in Table 6.

Grading classification

Grading is performed according to Table 7.

Table 8 Scoring criteria for root and bone health.

Parameter	CBCT finding	Scoring standard
Root resorption	0 mm ≤ no root resorption observed or apical resorption ≤ 2.0 mm	0
	2.0 mm < apical resorption ≤ 4.0 mm	−3
	Apical resorption > 4.0 mm	−6
Bone fenestration	0 mm ≤ no buccal/lingual bone deficiency or change in vertical bone defect ≤ 4.0 mm (1/3 root length)	0
	4.0 mm < change in vertical bone defect ≤ 6.0 mm (1/2 root length)	−2
	6.0 mm < change in vertical bone defect ≤ 8.0 mm (2/3 root length)	−5
	Change in vertical bone defect > 8.0 mm	−10
Bone dehiscence	0 mm ≤ no buccal/lingual bone deficiency or change in vertical bone defect ≤ 4.0 mm (1/3 root length)	0
	4.0 mm < change in vertical bone defect ≤ 6.0 mm (1/2 root length)	−2
	6.0 mm < change in vertical bone defect ≤ 8.0 mm (2/3 root length)	−5
	Change in vertical bone defect > 8.0 mm	−10

Evaluation and assessment of root and bone health

Evaluation materials

Pre- and post-treatment CBCT scans.

Objective indicators

These include:
- root resorption;
- bone fenestration;
- bone dehiscence.

Measurement methods

Root resorption

Root resorption of the entire maxillary and mandibular dentition is systematically assessed on pre- and post-treatment CBCT images. Typical manifestations of root resorption include blunting of the apical contour, irregular or spiculated margins, formation of conical radiolucent chambers, serrated apical contours and significant shortening of root length.[38-41] For quantitative evaluation, the tooth exhibiting the most severe root resorption is selected as the reference. The vertical root length along the long axis of this tooth is measured on both pre- and post-treatment CBCT images, and the change in vertical root length is calculated.

Bone fenestration

Changes in bone fenestration of the entire maxillary and mandibular dentition are systematically assessed on pre- and post-treatment CBCT images. Bone fenestration is characterised by an increased area of buccal or lingual bone plate deficiency, with partial exposure of the root surface beyond the buccal or lingual alveolar plate. For quantitative evaluation, the tooth exhibiting the most severe bone fenestration is selected as the reference. The vertical distance from the most coronal point to the most apical point of the fenestration along the long axis of the tooth is measured on both pre- and post-treatment CBCT images, and the change in vertical distance is calculated.

Bone dehiscence

Changes in bone dehiscence in the entire maxillary and mandibular dentition are systematically assessed on pre- and post-treatment CBCT images. Bone dehiscence is characterised by an increased area of buccal or lingual bone plate deficiency, with complete exposure of the root surface beyond the buccal or lingual alveolar plate. For quantitative evaluation, the tooth exhibiting the most severe bone dehiscence is selected as the reference. The vertical distance from the cementoenamel junction to the most apical point of the alveolar crest along the long axis of the tooth is measured on both pre- and post-treatment CBCT images, and the change in vertical distance is calculated.

Scoring criteria

The scoring criteria are presented in Table 8.

Grading classification

Based on the comprehensive assessment of root resorption, bone fenestration and bone dehiscence, a total deduction score of 0 indicates that the patient main-

Table 9 Normative values for cephalometric measurements.

Cephalometric measurement	Mean ± standard deviation	
	Adolescents (< 18 y)	**Adults (18–40 y)**
ANB, degrees	2.6 ± 1.5	2.1 ± 1.4
MP/SN, degrees	34.0 ± 6.7	31.8 ± 5.2
Sn-GPos, mm	5.1 ± 2.7	4.5 ± 2.9
UL-E, mm	−1.1 ± 1.5	−1.5 ± 2.0
Bs-GPos, mm	−1.5 ± 1.2	−1.1 ± 1.4

tains healthy root and bone status following orthodontic treatment. Any deduction indicates a decline in root and bone health after treatment, with higher deduction scores reflecting poorer post-treatment root and bone health status.

Evaluation of facial profile harmony

Evaluation materials

Pre- and post-treatment profile photographs and corresponding lateral cephalometric radiographs.

Objective indicators

These include:

- subspinale-nasion-supramental angle (ANB);
- mandibular plane to sella-nasion angle (MP/SN);
- perpendicular distance from subnasale to glabella-pogonion of the soft tissue line (Sn-GPos);
- upper lip protrusion to the aesthetic plane distance (UL-E);
- perpendicular distance from sublabiale to glabella-pogonion of the soft tissue line (Bs-GPos).

Measurement methods

Subspinale-nasion-supramental angle (ANB)

On pre- and post-treatment lateral cephalometric radiographs corresponding to the profile photographs, identify the subspinale (A), nasion (N) and supramental (B). A is defined as the deepest point on the premaxillary contour between the anterior nasal spine and the alveolar crest; N is the most anterior point of the nasofrontal suture; and B is the deepest point on the mandibular alveolar contour between the alveolar crest and pogonion. Measure the angle formed by point A-N-point B. The angle is recorded as positive when point A is anterior to point B, and negative when point A is posterior to point B. Standardise the measured value using the formula $z = I(\text{measured value} - \text{mean})/\text{standard deviation}I$. The normative means and standard deviations are presented in Table 9. Calculate the difference between pre- and post-treatment standardised values: $\Delta z = z_{pre} - z_{post}$.

Mandibular plane to sella-nasion angle (MP/SN)

On pre- and post-treatment lateral cephalometric radiographs corresponding to the profile photographs, identify the sella (S), nasion (N) and menton (Me). S is the centre of the sella turcica; N is the most anterior point of the nasofrontal suture; and Me is the most inferior point of the mandibular symphysis. Measure the anterior inferior angle formed by the tangent line connecting Me to the lower border of the mandibular angle and the sella-nasion plane (SN plane). Standardise the measured value as described above. Calculate the difference between pre- and post-treatment standardised values using the equation $\Delta z = z_{pre} - z_{post}$.

Perpendicular distance from subnasale to glabella-pogonion of the soft tissue line (Sn-GPos)

On pre- and post-treatment lateral cephalometric radiographs corresponding to the profile photographs, identify the glabella (G), subnasale (Sn) and soft tissue pogonion (Pos). G is the most anterior point of the forehead; Sn is the junction of the columella and the upper lip; and Pos is the most anterior point of the soft tissue chin. Measure the perpendicular distance from Sn to the line connecting G and Pos. The distance is recorded as positive if Sn lies anterior to the G-Pos line, and negative if posterior. Standardise the measured value as described above. Calculate the difference between pre- and post-treatment standardised values using the equation $\Delta z = z_{pre} - z_{post}$.

Table 10 Scoring criteria for cephalometric measurements.

Objective measurement	Standardised value difference (Δz)	Scoring standard
ANB	< 0	−1.9
	0	0
	> 0	+1.9
MP/SN	< 0	−1.4
	0	0
	> 0	+1.4
Sn-GPos	< 0	−2.0
	0	0
	> 0	+2.0
UL-E	< 0	−2.6
	0	0
	> 0	+2.6
Bs-GPos	< 0	−2.1
	0	0
	> 0	+2.1

Upper lip protrusion to the aesthetic plane distance (UL-E)

On pre- and post-treatment lateral cephalometric radiographs corresponding to the profile photographs, identify the pronasale (Prn), soft tissue pogonion (Pos) and upper lip protrusion point (UL). Prn is the most prominent point of the nasal tip, Pos is the most anterior point of the soft tissue chin and UL is the most prominent point of the upper lip. Measure the perpendicular distance from UL to the line connecting Prn and Pos (Ricketts' aesthetic plane). The distance is recorded as positive if UL lies anterior to the Prn-Pos line, and negative if posterior. Standardise the measured value as described above. Calculate the difference between pre- and post-treatment standardised values using the equation $\Delta z = z_{pre} - z_{post}$.

Perpendicular distance from sublabiale to glabella-pogonion of the soft tissue line (Bs-GPos)

On pre- and post-treatment lateral cephalometric radiographs corresponding to the profile photographs, identify the glabella (G), sublabiale (Bs) and soft tissue pogonion (Pos). G is the most anterior point of the forehead, Bs is the deepest point of the labiomental sulcus and Pos is the most anterior point of the soft tissue chin. Measure the perpendicular distance from Bs to the line connecting G and Pos. The distance is recorded as positive if Bs lies anterior to the G-Pos line, and negative if posterior. Standardise the measured value as described above. Calculate the difference between pre- and post-treatment standardised values using the equation $\Delta z = z_{pre} - z_{post}$.

Scoring criteria

The scoring criteria are presented in Table 10.

Grading classification

The grading classification is presented in Table 11. If the difference between pre- and post-treatment measured values is less than 1 degree for angular measurements or less than 1 mm for linear measurements, the parameter is considered unchanged, Δz is set to 0 and a score of 0 is assigned for that parameter. The total score S is calculated as the sum of the scores for the five parameters listed above.[42]

The total score S ranges from –10 to 10. A positive S value indicates improvement in facial profile harmony, with larger values reflecting more pronounced improvement and smaller values reflecting less pronounced improvement. A negative S value indicates deterioration in facial profile harmony, with smaller values reflecting more severe deterioration and larger values reflecting less severe deterioration.

Conclusion

In summary, the establishment of this expert consensus on orthodontic treatment outcome evaluation represents a significant milestone in the standardisation of orthodontic practice in China. By integrating the collective clinical wisdom of leading Chinese orthodontic specialists with rigorous scientific methodology, this consensus provides a systematic, quantifiable and clinically applicable framework for assessing post-treatment occlusal relationships, root and bone

Table 11 Grading classification criteria.

Outcome	Total score (S)
Improvement	> 0
No significant change	0
Deterioration	< 0

health and facial profile harmony. The 3D evaluation system, comprising 14 objective indicators with corresponding measurement methods and scoring criteria, enables reliable grading of treatment outcomes from excellent to worst. Although this consensus currently focuses on static morphological evaluation, it is important to acknowledge that orthodontic treatment outcomes encompass dynamic functional recovery and long-term stability, which warrant further investigation and will be addressed in future iterations. Additionally, as this evaluation system is calibrated specifically to Chinese patient populations and expert perspectives, its application in diverse clinical settings and potential adaptation for international contexts require continued validation through multicentre studies and long-term follow-up observations. The ultimate goal is to establish an evidence-based, continuously evolving standard that enhances treatment quality, facilitates specialist training and promotes scientific research in orthodontics.

Conflicts of interest

The authors declare no conflicts of interest related to this study.

Author contribution

This document was drafted under the leadership of Peking University School and Hospital of Stomatology, with participation from West China Hospital of Stomatology, Sichuan University; The Third Affiliated Hospital of Air Force Medical University; Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine; Hospital of Stomatology, Wuhan University; School of Stomatology, Nanjing Medical University; Hospital of Stomatology, Guanghua School of Stomatology, Sun Yat-sen University; Stomatological Hospital of Chongqing Medical University; Shanghai Stomatological Hospital, Fudan University; Beijing Stomatological Hospital, Capital Medical University; Hospital of Stomatology, Jilin University; Tongji Medical College, Huazhong University of Science and Technology; and School of Stomatology, Zhejiang Chinese Medical University.

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References

1. Richmond S, Shaw WC, O'Brien KD, et al. The development of the PAR Index (Peer Assessment Rating): Reliability and validity. Eur J Orthod 1992;14:125–139.
2. Casko JS, Vaden JL, Kokich VG, et al. Objective grading system for dental casts and panoramic radiographs. Am J Orthod Dentofacial Orthop 1998;114:589–599.
3. Daniels C, Richmond S. The development of the index of complexity, outcome and need (ICON). J Orthod 2000;27:149–162.
4. Hong M, Kook YA, Kim MK, et al. The Improvement and Completion of Outcome index: A new assessment system for quality of orthodontic treatment. Korean J Orthod 2016;46:199–211.
5. Safavi SM, Farzan A, Younessian F, et al. Prioritized commitment-based clinical assessment: A new method for assessment of orthodontic treatment outcomes. Turk J Orthod 2021;34:182–188.
6. Pinskaya YB, Hsieh TJ, Roberts WE, et al. Comprehensive clinical evaluation as an outcome assessment for a graduate orthodontics program. Am J Orthod Dentofacial Orthop 2004;126:533–543.
7. Song GY, Li WR, Geng Z, et al. Consistency of subjective evaluation on orthodontic treatment outcome satisfaction [in Chinese]. Beijing Da Xue Xue Bao Yi Xue Ban 2012;44:103–107.
8. Song GY, Zhao ZH, Ding Y, et al. Subjective evaluation of orthodontic treatment outcome satisfaction by 69 orthodontic specialists [in Chinese]. Zhonghua Kou Qiang Yi Xue Za Zhi. 2012;47:134–138.
9. Liu SQ, Shen G, Bai D, et al. Consistency of subjective judgment on malocclusion severity among Chinese orthodontic specialists [in Chinese]. Beijing Da Xue Xue Bao Yi Xue Ban 2012;44:98–102.

10. Song GY, Jiang RP, Zhang XY, et al. Validity of subjective and objective methods for evaluating orthodontic treatment outcomes [in Chinese]. Beijing Da Xue Xue Bao Yi Xue Ban 2015;47:90–97.
11. Song GY, Baumrind S, Zhao Z, et al. Validation of the American Board of Orthodontics Objective Grading System for assessing the treatment outcomes of Chinese patients. Am J Orthod Dentofacial Orthop 2013;144:391–397.
12. Song GY, Zhao ZH, Ding Y, et al. Reliability assessment and correlation analysis of evaluating orthodontic treatment outcome in Chinese patients. Int J Oral Sci 2014;6:50–55.
13. Yu X, Liu B, Pei Y, et al. Evaluation of facial attractiveness for patients with malocclusion: A machine-learning technique employing Procrustes. Angle Orthod 2014;84:410–416.
14. Yu XN, Bai D, Feng X, et al. Correlation between cephalometric measures and end-of-treatment facial attractiveness. J Craniofac Surg 2016;27:405–409.
15. Liu S, Oh H, Chambers DW, et al. Validity of the American Board of Orthodontics Discrepancy Index and the Peer Assessment Rating Index for comprehensive evaluation of malocclusion severity. Orthod Craniofac Res 2017;20:140–145.
16. Liu S, Oh H, Chambers DW, et al. Interpreting weightings of the peer assessment rating index and the discrepancy index across contexts on Chinese patients. Eur J Orthod 2018;40:157–163.
17. Song GY, Wang X, Teng F, et al. Consistency analysis of PAR index measurements between computer-based three-dimensional digital measurement and manual measurement. Chin J Orthod 2019;26:22–26.
18. Xu K, Hasan SE, Chen G, et al. Measuring orthodontic treatment impact: Description or judgment, challenge or result. Am J Orthod Dentofacial Orthop 2021;159:389–397.
19. Wang X, Zhao X, Song G, et al. Machine learning-based evaluation on craniodentofacial morphological harmony of patients after orthodontic treatment. Front Physiol 2022;13:862847.
20. Chen H, Song G, Li W, et al. Subjective and objective analysis of orthodontic expert consensus on the assessment of orthodontic treatment outcomes. Orthod Craniofac Res 2023;26:197–206.
21. Cangialosi TJ, Riolo ML, Owens SE Jr, et al. The ABO discrepancy index: A measure of case complexity. Am J Orthod Dentofacial Orthop 2004;125:270–278.
22. Zhang X, Baumrind S, Chen G, et al. Longitudinal eruptive and posteruptive tooth movements, studied on oblique and lateral cephalograms with implants. Am J Orthod Dentofacial Orthop 2018;153:673–684.
23. Halimi A, Benyahia H, Azeroual MF, et al. Relationships between facial divergence and DMD parameters. Int Orthod 2017;15:698–707.
24. Halimi A, Benyahia H, Azeroual MF, et al. Relationship between the curve of Spee and craniofacial variables: A regression analysis. Int Orthod 2018;16:361–373.
25. Wu WZ, Weng XR, Ren C, et al. Correlation between the ABO-Objective Grading System and the subjective evaluation of orthodontic treatment outcomes by Chinese experts. Electron J Gen Stomatol 2018;5:106–108.
26. Vu CQ, Roberts WE, Hartsfield JK Jr, et al. Treatment complexity index for assessing the relationship of treatment duration and outcomes in a graduate orthodontics clinic. Am J Orthod Dentofacial Orthop 2008;133:9–13.
27. Djordjević J, Sćepan I, Glisić B. Evaluation of agreement and correlation of three occlusal indices in an assessment of orthodontic treatment need. Vojnosanit Pregl 2011;68:125–129.
28. Liao ZY, Jian F, Long H, et al. Validity assessment and determination of the cutoff value for the Index of Complexity, Outcome and Need among 12-13 year-olds in Southern Chinese. Int J Oral Sci 2012;4:88–93.
29. Sfondrini MF, Zampetti P, Luscher G, et al. Orthodontic treatment and healthcare goals: Evaluation of multibrackets treatment results using PAR Index (Peer Assessment Rating). Healthcare (Basel) 2020;8:473.
30. Arruda AO. Occlusal indexes as judged by subjective opinions. Am J Orthod Dentofacial Orthop 2008;134:671–675.
31. Pae EK, McKenna GA, Sheehan TJ, et al. Role of lateral cephalograms in assessing severity and difficulty of orthodontic cases. Am J Orthod Dentofacial Orthop 2001;120:254–262.
32. Cooke MS, Wei SH. Cephalometric standards for the southern Chinese. Eur J Orthod 1988;10:264–272.
33. Xu TM, Korn EL, Liu Y, et al. Facial attractiveness: Ranking of end-of-treatment facial photographs by pairs of Chinese and US orthodontists. Am J Orthod Dentofacial Orthop 2008;134:74–84.
34. Sameshima GT, Iglesias-Linares A. Orthodontic root resorption. J World Fed Orthod 2021;10:135–143.
35. Yassir YA, McIntyre GT, Bearn DR. Orthodontic treatment and root resorption: An overview of systematic reviews. Eur J Orthod 2021;43:442–456.
36. Nalbantoğlu AM, Yanık D. Fenestration and dehiscence defects in maxillary anterior teeth using two classification systems. Aust Dent J 2023;68:48–57.
37. Kajan ZD, Seyed Monir SE, Khosravifard N, et al. Fenestration and dehiscence in the alveolar bone of anterior maxillary and mandibular teeth in cone-beam computed tomography of an Iranian population. Dent Res J (Isfahan) 2020;17:380–387.
38. Levander E, Malmgren O. Evaluation of the risk of root resorption during orthodontic treatment: A study. Eur J Orthod 1988;10:30–38.
39. Feller L, Khammissa RA, Thomadakis G, et al. Apical external root resorption and repair in orthodontic tooth movement: Biological events. Biomed Res Int 2016;2016:4864195.
40. Castro IO, Alencar AH, Valladares-Neto J, et al. Apical root resorption due to orthodontic treatment detected by cone beam computed tomography. Angle Orthod 2013;83:196–203.
41. Deng Y, Sun Y, Xu T. Evaluation of root resorption after comprehensive orthodontic treatment using cone beam computed tomography (CBCT): A meta-analysis. BMC Oral Health 2018;18:116.
42. Battagel JM. A comparative assessment of cephalometric errors. Eur J Orthod 1993;15:305–314.