SPECIAL ARTICLE

The case management form of the American Board of Orthodontics

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The directors of the American Board of Orthodontics (ABO) continually strive to enhance the written and clinical certification examinations to achieve a fair, consistent, and objective assessment of every orthodontist who is examined. It is important to design testing processes that are as valid and reliable as possible. This article introduces the ABO's latest testing instrument that will enhance the objectivity of the clinical examination.

Background

In the early 1980s, the ABO hired an educational testing consultant for professional guidance on refining both written and clinical examinations.[1] In 1994, the ABO began a concerted project to increase the objectivity of the clinical examination.

The directors explored a number of indeces and assessments of pretreatment and posttreatment records but found that none met the purposes and objectives of the ABO clinical examination.[2-7] An ABO committee therefore began developing and testing objective methods for evaluating posttreatment dental casts and panoramic radiographs. The culmination of these efforts was announced in November 1998 when the ABO introduced the cast evaluation form in the article, "Objective grading system for dental casts and panoramic radiographs," in the *AJO-DO*.[8]

The directors also realized that another essential component for objective evaluation of orthodontic therapy was a measure of the patient's pretreatment status. The initial intent was to record case difficulty. The directors decided to measure the complexity of the original occlusal and skeletal relationships instead. *Complexity* is a more relevant term because it indicates abnormal findings rather than difficulty level and involves factors in addition to the observable relationships. A method to evaluate and score complexity based on a cumulative problem list was developed and tested, and the culmination of that effort, the discrepancy index, was published in March 2004.[9]

Each testing instrument was developed after several years of field testing, leading to refinement of format and application. An additional intention of these instruments is to assist orthodontists in assessing their own cases. Thus, both forms could be used in the examination process and as a mechanism for self-evaluation of orthodontic therapy.

The board's most recent form is intended for evaluating the remaining information in ABO case reports including pretreatment and posttreatment cephalometric analyses, assessments of facial esthetics, evaluations of arch form and size, quality of the case records, the written explanation of the case, and the overall management of therapy. The form that will focus on these aspects is the case management form (CMF), discussed in this article.

Development of the CMF

In the mid 1990s, the board developed an internal evaluation form for all aspects of an ABO case report, including management of the case from diagnosis to completion. That form, the CCRE notebook evaluation form, used a numeric rating scale for the examiner's judgment of the objectives and results of treatment.[10] This form has been used by the ABO until now.

In 2001, an ad hoc ABO committee was organized to develop an instrument to be used by both the examiner and the candidate to evaluate the therapeutic management of a case and become part of the ABO case report. The specific intent was the same as the cast evaluation form and the discrepancy index form as the orthodontist's pretest, self-evaluation tool. The examiner would then use the same form to judge the presented case.

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Unlike the evaluation of posttreatment casts, when orthodontists would customarily agree on an appropriate arrangement of the dentition, cephalometric and soft tissue evaluations are more subjective. There are many cephalometric and facial analyses, each having its own proponents and bases of credibility. The board has therefore attempted to emphasize objectivity in an arena of wide diversity of opinion. The ABO examiner must judge a case's overall therapeutic result without favoring a specific treatment technique, philosophy, or cephalometric analysis.

Beginning at the 2002 clinical examination, the ad hoc committee used the first prototype of the CMF. Although actual numerical changes in cephalometric measurements were initially explored for scoring, field tests showed that these scores were too cumbersome and complex. Alternatively, a numeric rating scale was used to record the candidate's and the examiner's scores. Revisions and additional field tests followed, and diplomates who completed voluntary recertification used the CMF at the 2004 clinical examination. A survey of the recertification candidates and ABO examiners provided additional information to guide revision. The fourth revision was tested at the 2005 clinical examination. Based on these assessments, the ABO decided to officially accept the CMF and include it as a portion of the case reports for all clinical-examination candidates in 2006.

Explanation of the CMF

An advantage of the CMF is its minimal learning curve for a candidate to become competent in its use. One needs only to read the instructions, follow the steps, and complete the form. Figure 1 is the front page of the CMF, and Figure 2 is the reverse side, including the instructions.

The overall concepts of the CMF are as follows:

1. It is a 1-page format that can be completed by the candidate in a reasonable time (10-15 minutes).
2. It is the only current form with a portion completed by the candidate (clear blocks) and a portion completed by the ABO examiner (grey blocks).
3. The candidate will record the cephalometric and dental measurements in the appropriate columns. This is essentially the same information as in the previous cephalometric summary sheet of the ABO's case report. The CMF will replace that sheet in the case report.
4. Three major areas of analysis are required of the candidate: skeletal, dental, and facial. The candidate will record a succinct statement of the therapeutic objectives of each parameter in the "candidate tx objectives" space.

The candidate will then self-score each parameter under "cand. score," using a rating of either acceptable (0) or unacceptable (1). The "cand. score" column is then totaled and recorded to complete the candidate's responsibility in completing the CMF.

The last paragraph of the instructions under Part 6 admonishes the candidate to be candid in this evaluation because the ABO examiner may challenge this score. The candidate must defend the scoring if questioned by the examiner.

There is a blank line under the "facial analysis" portion of the CMF. The ad hoc committee considered several available measures of the face and facial esthetics. Each seemed to have limitations based on the records required and the commonality of use. The ABO expects that a sound and common measure of facial esthetics will emerge as a component of case analysis.

ABO examiner section

The gray portions of the CMF are for the ABO examiner's use.

The ABO examiner also scores the skeletal, dental, and facial analysis areas, and might agree or disagree with the candidate's scoring. The ABO examiner's scores will be counted in the subscore.

A significant aspect of the presentation of an ABO case report is whether the records meet ABO specifications. Quality, accuracy, and compliance with appropriate time intervals are all evaluated by the ABO examiner. Each category of records in every treatment stage is determined to be either acceptable or unacceptable and is scored in the "records analysis" portion of the CMF.

The "overall analysis" section of the CMF assesses the entire management of the case. A separate ABO examiner worksheet, unaddressed here, is used to note significant discrepancies in case management. The "overall analysis" is an effective mechanism for the ABO examiner to assign increased importance for deficiencies that carry more impact than others in case management. As a method of checks and balances, the ABO examiner must be able to defend the score in this portion of the CMF to the ABO directors.

The total score for all 3 subtotals of the CMF is determined by the ABO examiner. A copy of the CMF noting both the candidate's and the ABO examiner's scores is kept in the candidate's file.

ABO CASE MANAGEMENT FORM

MEASUREMENTS

SHADED AREA FOR EXAMINER ONLY

SKELETAL ANALYSIS (S)

		PRE TX A1	PROG A2	POST TX B	DIFF. A1-B
CEPHALOMETRIC	SNA°				
	SNB°				
	ANB°				
	SN Go-Gn°				
	FMA°				

DENTAL ANALYSIS (D)

		PRE TX A1	PROG A2	POST TX B	DIFF. A1-B
CEPHALOMETRIC	1 TO NA mm				
	1 TO SN°				
	1 TO NB mm				
	1 TO Go-Gn°				
ARCH	6 TO 6 WIDTH				
	6 TO 6 WIDTH				
	3 TO 3 WIDTH				
	CURVE OF SPEE				
	MANDIBULAR ARCH FORM				

FACIAL ANALYSIS (F)

		PRE TX A1	PROG A2	POST TX B	DIFF. A1-B
	E-LINE				

SCORING

0-Acceptable 1-Unacceptable

	CANDIDATE TX OBJECTIVES	PRE TX OBJ	POST TX RESULTS	Cand. Score	EX. SCORE
A-P MX		0 1	0 1		
A-P MN		0 1	0 1		
VERT MX		0 1	0 1		
VERT MN		0 1	0 1		
A-P MX		0 1	0 1		
A-P MN		0 1	0 1		
VERT		0 1	0 1		
TRANS MX		0 1	0 1		
TRANS MN		0 1	0 1		
TRANS ANT		0 1	0 1		
CURVE OF SPEE		0 1	0 1		
ARCH FORM MN		0 1	0 1		
FACIAL ESTHETICS		0 1	0 1		
				Scoring sub-totals for S-D-F	

RECORDS ANALYSIS

	FACIAL PHOTOS	INTRAORAL PHOTOS	INTRAORAL RADIOGRAPHS	CEPH. & TRACINGS	COMP. TRACING	DENTAL CASTS	CASE REPORT	PRESENT. QUALITY	
PRE-TX A1 &/OR PROG. A2	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	
FINAL B	0 1	0 1	0 1	0 1	0 1	0 1	0 1	0 1	SUB-TOTAL RECORDS ANALYSIS

OVERALL ANALYSIS

TREATMENT PLANNING / MECHANOTHERAPY				FINAL TREATMENT RESULTS				
0 ACCEPT	1	2 DEFICIENCIES	3	0 ACCEPT	1	2 DEFICIENCES	3	SUB-TOTAL OVERALL ANALYSIS

DATE_____
CANDIDATE_____
EXAMINER_____

CANDIDATE#_____
CASE#_____

SUPERIOR

TOTAL

Fig 1. ABO CMF.

ABO CASE MANAGEMENT FORM - CANDIDATE INSTRUCTIONS
Type or Print Legibly

The following instructions pertain to the Skeletal, Dental and Facial Analysis measurements listed on this form:

1. Use the "Pre-Tx" Column (A1) to record *initial* measurements.
2. Use the "Prog." Column (A2) to record *progress* measurements.
3. Use the "Post-Tx" Column (B) to record *final* measurements.
4. Use the "Diff" Column (A1-B) to record the numerical difference between *initial* and *final* measurements.
5. In the space "Candidates Tx Objectives" please enter a succinct comment on your treatment objective for each of the areas of analysis. The measurements on the left coincide with the general area of analysis on the right. The ANB does not have an area of comment. The vertical- dental area does not have a measurement on the left. Leave the bottom line under "Facial Analysis" blank
6. Based on a retrospective comparison of your pretreatment objectives and post-treatment results score and record your judgment for each subdivision under the following columns:

   a. Pre-Tx Objectives Column
      Were your Skeletal, Dental and Facial objectives, as outlined in your Case Report, appropriate for this case?
      Circle 0 if appropriate
      Circle 1 if inappropriate
   b. Post-Tx Results Column
      Do you consider the post-treatment results to be an acceptable or unacceptable change?

      Circle 0 if acceptable
      Circle 1 if unacceptable

Your original treatment objectives and your therapeutic ability to satisfy these objectives will be evaluated by the ABO examiner to determine if your objectives and treatment were appropriate. The examiner may critique the validity of your numbers and candor of your self-evaluation of the case. You should therefore be prepared to defend your scoring rationale.

7. Once you have circled either 0 or 1 in each of the "Pre-Tx Objectives" and "Post-Tx Results" spaces, transfer these values to the "Candidate Score" Column.
8. Total the values in the "Candidate Score" Column and enter this number in the box labeled "Scoring Subtotals for S-D-F".
9. Please photocopy the completed Case Management Form on the blue colored paper and place it in the binder's pocket.
10. The candidate's responsibility in completion or the Case Management Form has now been satisfied this original form should be placed in a plastic cover that follows the Cast Evaluation Form in the case binder.

Explanation of the Arch Portion of the Dental Analysis:

a. **Molar and Canine Arch Width Measurements** – Use any point(s) on a tooth that can be conveniently measured on the pre-treatment and post-treatment casts. Include a sentence in the "Objectives of Treatment" section of your case report to describe the anatomic points that you used for determination of maxillary and mandibular arch widths.

b. Curve **of Spee** - Unilateral measurement of the deepest curve of Spee on the mandibular cast. This is defined as a vertical measurement (millimeters) from a horizontal plane resting on the most distal-buccal molar cusp tip and the ipsilateral central incisor edge to the most gingivally positioned premolar or deciduous molar buccal cusp tip.

c. Mandibular **Arch Form** - Use the following arch form descriptions and abbreviations to document arch form in the "Pre-Tx", "Prog." and "Post-Tx" Columns:

OVOID (Ov) **ROUND (Rd)** **TAPERED(Ta)** **SQUARE (Sq)**
For the "Diff." Column: Record "SAME" if the *initial* arch form was **maintained** in the *final* result.
Record "CHG" if the *initial* arch form was **changed** in the *final* result.

Fig 2. Instructions for ABO CMF.

Use of the CMF score

After the 2004 and 2005 field testing of the CMF, the ABO correlated the scoring of the CMF with the ABO examiners' subjective analyses of recertification cases to determine a passing score. This score could be modified as the ABO gains more experience and data pertaining to the CMF. However, the ABO advises that a total score of 5 or below is passing, and 9 or above is failing.

A total score of 6, 7, or 8 would be considered marginal, and the ABO directors would make a final pass-or-fail decision at the clinical examination. If the candidate evaluates a potential case to be used at the clinical examination with a self-score of the skeletal, dental, and facial subtotal that is 7 or more, careful consideration should be given to whether that case is appropriate for presentation. Understanding the form should also foster increased confidence for the candidate's display at the clinical examination.

Summary

This article introduces and explains the CMF, which is the third in a trio of instruments designed to increase objectivity of the ABO clinical examination. The process is by no means complete, however. The ABO will continue to refine these testing instruments and examination systems to achieve the most just and effective examination process. The ABO hopes that participation in the certification process will encourage every orthodontist to achieve his or her highest level of clinical proficiency.

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