Supplementary Material S2: STRUCTURED CASE-BASED CLINICAL DECISION ASSESSMENT FORM

48 Synthetic Orthodontic–Periodontal Cases

Evaluator Information

Evaluator code:		**Specialty:**	☐ Orthodontics ☐ Periodontology
Date:	____ / ____ / _____	**Number of cases:**	48

Administration: Each case is assessed independently. Orthodontist and periodontist responses are not shared with each other. No second consultation round is conducted. All evaluators receive the same standardized case information. No total score is calculated; each item is a separate clinical decision variable.

A. Common Items for All Specialists

S1 — Feasibility of initiating orthodontic treatment from a periodontal perspective

Considering the current periodontal findings, assess whether orthodontic treatment can be initiated.

Code	Clinical decision	Definition
0	Can be initiated directly	Treatment can be initiated without additional case-specific periodontal intervention.
1	Can be initiated with close periodontal monitoring	No additional pretreatment intervention is required; periodontal monitoring closer than routine follow-up is necessary.
2	Can be initiated after periodontal intervention/stabilization	Case-specific periodontal intervention and/or stabilization is required before orthodontic treatment.
3	Not appropriate under current periodontal conditions	Initiating orthodontic treatment is not appropriate given the current periodontal status.
9	Could not be assessed	The information provided is insufficient to make a decision.

S2 — Risk of adverse periodontal effects during orthodontic treatment

Considering the current clinical, periodontal, and orthodontic findings, assess the risk of adverse effects on periodontal tissues if orthodontic treatment is performed.

0 — Minimal risk: No clinically significant risk of adverse periodontal effects is anticipated.

1 — Low risk: There is a risk of transient and reversible periodontal changes (e.g., gingival inflammation).

2 — Moderate risk: There is a risk of clinically significant periodontal changes, such as gingival recession and/or periodontal pocket formation or deepening of existing pockets.

3 — High risk: Clinical attachment and/or alveolar bone loss that may develop or progress during orthodontic treatment may seriously compromise periodontal support and tooth prognosis, potentially progressing to tooth loss.

9 — Could not be assessed: The available case information is insufficient to determine the periodontal risk level.

Note: 9 is a valid risk score; it is not used in place of NA.

S3 — Need for an orthodontic approach adapted to periodontal conditions

Considering the current periodontal and orthodontic findings together, indicate which of the following is required in the orthodontic treatment approach to protect periodontal tissues.

Code	Decision
0	No specific orthodontic adaptation is required from a periodontal perspective
1	Controlled application of orthodontic forces is required, taking periodontal conditions into account
2	The direction of orthodontic movement must be determined with consideration of the biological/anatomical boundaries of periodontal tissues
3	Both controlled application of orthodontic forces and determination of movement direction with consideration of the biological/anatomical boundaries of periodontal tissues are required
9	Could not be assessed using the available data

S4 — Confidence level in the clinical assessment

Indicate your overall confidence in the clinical assessments you made for this case.

Code	Confidence level	Definition
0	**Low**	I have limited confidence in my clinical assessment
1	**Moderate**	I am moderately confident in my clinical assessment
2	**High**	I am highly confident in my clinical assessment
3	**Very high**	I am completely or almost completely confident in my clinical assessment
9	**Could not be assessed**	The available case information is insufficient to assess my confidence level

B. For Orthodontists Only

O1 assesses the content of the plan, whereas O2 assesses the impact of periodontal requirements on treatment timing/sequencing.

O1 — Impact of periodontal findings on the content of the orthodontic treatment plan

O1a — Need for plan modification

Considering the current periodontal findings, is modification of the content of the orthodontic treatment plan necessary?

Code	Decision
0	Modification not required
1	Modification required
9	Could not be assessed

O1b — Type of plan modification required

Complete only if O1a = 1. Multiple options may be selected.

☐ Limitation of the amount of planned tooth movement (M)

☐ Modification of the direction of planned tooth movement (Y)

☐ Avoidance of specific orthodontic movement(s) (K)

☐ Modification of force magnitude and/or biomechanics (B)

☐ Modification of the anchorage approach (A)

☐ Modification or limitation of orthodontic treatment objectives (H)

☐ Modification of the extraction/tooth preservation plan (Ç)

☐ Other: _____ (D)

O2 — Impact of periodontal requirements on orthodontic treatment timing and sequencing

Considering periodontal requirements, what adjustment is needed in the timing of orthodontic treatment initiation or the sequencing of treatment stages?

Code	Clinical decision	Definition
0	No change in timing/sequencing required	Orthodontic treatment can proceed without periodontal-related delay or specific changes in sequencing.
1	Concurrent periodontal coordination required	No delay is required; periodontal monitoring/care must be conducted concurrently with orthodontic treatment.
2	Postponement of a specific orthodontic stage required	Orthodontic treatment can be initiated; however, a specific movement/stage must be deferred until after periodontal assessment or intervention.
3	Postponement of orthodontic treatment initiation required	Orthodontic treatment must not be initiated until periodontal treatment/stabilization is complete.
9	Could not be assessed	The information provided is insufficient to make a timing/sequencing decision.

C. For Periodontists Only

P1 — Level of treatment required for periodontal disease control before orthodontic treatment

Considering the current periodontal findings, what level of treatment is required to control periodontal inflammation/disease so that orthodontic treatment can be performed safely?

Code	Clinical decision	Definition
0	No additional active periodontal treatment required	Standard preventive care and oral hygiene are sufficient.
1	Supragingival/preventive periodontal intervention required	Professional plaque control, supragingival instrumentation, and reinforcement of oral hygiene are required.
2	Subgingival periodontal treatment required	Periodontal reassessment must follow subgingival instrumentation. Periodontal flap surgery may be performed if indicated.
3	Need for surgical periodontal treatment anticipated	The need for periodontal surgery is anticipated following nonsurgical treatment and reassessment.
9	Could not be assessed	The information provided is insufficient to determine the required treatment level.

P2 — Need for and timing of mucogingival surgical intervention

P2a — Need for mucogingival surgical intervention

Considering the current mucogingival findings and planned orthodontic tooth movements, is mucogingival surgical intervention necessary?

Code	Decision
0	Not required
1	Required
9	Could not be assessed

P2b — Type of mucogingival surgical intervention required

Complete only if P2a = 1. Multiple options may be selected.

Code Decision

1 Free gingival graft (FGG)

2 Connective tissue graft / soft tissue augmentation

3 Root coverage procedure

4 Frenotomy / frenectomy

5 Vestibuloplasty

6 Other mucogingival surgical intervention: _____

9 Could not be assessed

P2c — Timing of mucogingival surgical intervention

Complete only if P2a = 1.

Code	Decision
1	Before orthodontic treatment
2	During orthodontic treatment
3	After orthodontic treatment
4	Based on reassessment after orthodontic movement
9	Could not be assessed

P2c codes are nominal categories, not severity levels.

D. Quick Scoring Forms for 48 Cases

Orthodontist Scoring Table

Case	S1	S2	S3	S4	O1a	O1b multiple	O2
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O1b short codes: M=Amount; Y=Direction; K=Avoidance; B=Force/biomechanics; A=Anchorage; H=Objectives; Ç=Extraction/preservation; D=Other.

Periodontist Scoring Table

Case	S1	S2	S3	S4	P1	P2a	P2b multiple	P2c
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PROMPTS FOR AI ASSESSMENT

For periodontist AI assessment

Act as an experienced periodontist. Assess the synthetic orthodontic–periodontal case to be presented below, jointly considering the clinical information, orthodontic and periodontal findings, specified orthodontic treatment plan, and available clinical/radiographic images.

Conduct your assessment from a periodontist's perspective, based on the orthodontic treatment plan specified in the case. In addition to assessing current periodontal inflammation/disease status, periodontal support, and mucogingival conditions, consider the relationship between periodontal tissues and the direction, amount, and biomechanical characteristics of planned orthodontic tooth movements.

In this context, determine the feasibility of initiating orthodontic treatment from a periodontal perspective (S1), risk of adverse periodontal effects during orthodontic treatment (S2), need for an orthodontic approach adapted to periodontal conditions (S3), confidence in your clinical assessment (S4), level of treatment required for periodontal disease control before orthodontic treatment (P1), need for mucogingival surgical intervention (P2a), and, if required, its type (P2b) and timing (P2c).

When assessing periodontal findings, consider not only the current periodontal status but also the potential effects on periodontal tissues of tooth movements envisaged in the specified orthodontic treatment plan. In particular, assess the risks and limitations that planned movements may pose with respect to periodontal support, alveolar bone boundaries, and mucogingival tissues.

S1 – Feasibility of initiating orthodontic treatment from a periodontal perspective

0: Can be initiated directly – Treatment can be initiated without additional case-specific periodontal intervention.

1: Can be initiated with close periodontal monitoring – No additional pretreatment intervention is required; periodontal monitoring closer than routine follow-up is necessary.

2: Can be initiated after periodontal intervention/stabilization – Case-specific periodontal intervention and/or stabilization is required before orthodontic treatment.

3: Not appropriate under current periodontal conditions – Initiating orthodontic treatment is not appropriate given the current periodontal status.

9: Could not be assessed – The information provided is insufficient to make a decision.

S2 – Risk of adverse periodontal effects during orthodontic treatment

0: Minimal risk – No clinically significant risk of adverse periodontal effects is anticipated.

1: Low risk – There is a risk of transient and reversible periodontal changes.

2: Moderate risk – There is a risk of clinically significant periodontal changes, such as gingival recession and/or periodontal pocket formation or deepening of existing pockets.

3: High risk – Clinical attachment and/or alveolar bone loss that may develop or progress during orthodontic treatment may seriously compromise periodontal support and tooth prognosis, potentially progressing to tooth loss.

9: Could not be assessed – The available case information is insufficient to determine the periodontal risk level.

S3 – Need for an orthodontic approach adapted to periodontal conditions

0: No specific orthodontic adaptation is required from a periodontal perspective.

1: Controlled application of orthodontic forces is required, taking periodontal conditions into account.

2: The direction of orthodontic movement must be determined with consideration of the biological/anatomical boundaries of periodontal tissues.

3: Both controlled application of orthodontic forces and determination of movement direction with consideration of the biological/anatomical boundaries of periodontal tissues are required.

9: Could not be assessed using the available data.

S4 – Confidence level in the clinical assessment

0: Low – I have limited confidence in my clinical assessment.

1: Moderate – I am moderately confident in my clinical assessment.

2: High – I am highly confident in my clinical assessment.

3: Very high – I am completely or almost completely confident in my clinical assessment.

9: Could not be assessed – The available case information is insufficient to assess my confidence level.

P1 – Level of treatment required for periodontal disease control before orthodontic treatment

Considering the current periodontal findings, determine the level of treatment required to control periodontal inflammation/disease so that orthodontic treatment can be performed safely.

0: No additional active periodontal treatment required – Standard preventive care and oral hygiene are sufficient.

1: Supragingival/preventive periodontal intervention required – Professional plaque control, supragingival instrumentation, and reinforcement of oral hygiene are required.

2: Subgingival periodontal treatment required – Subgingival instrumentation followed by periodontal reassessment is required.

3: Need for surgical periodontal treatment anticipated – The need for periodontal surgery is anticipated following nonsurgical treatment and reassessment.

9: Could not be assessed – The information provided is insufficient to determine the required level of periodontal treatment.

P2a – Need for mucogingival surgical intervention

Assess the current mucogingival findings together with the planned orthodontic tooth movements and determine whether mucogingival surgical intervention is required.

0: Not required.

1: Required.

9: Could not be assessed.

P2b – Type of mucogingival surgical intervention required

Assess only if P2a = 1. Multiple options may be specified. Report the applicable options using the following short codes:

S: Free gingival graft (FGG)

B: Connective tissue graft / soft tissue augmentation

K: Root coverage procedure

F: Frenotomy / frenectomy

V: Vestibuloplasty

D: Other mucogingival surgical intervention

If multiple interventions are required, specify the corresponding short codes together (e.g., S, F).

If P2a = 0, write “Not applicable” for P2b.

If P2a = 9, write “Could not be assessed” for P2b.

P2c – Timing of mucogingival surgical intervention

Assess only if P2a = 1.

1: Before orthodontic treatment.

2: During orthodontic treatment.

3: After orthodontic treatment.

4: Based on reassessment after orthodontic movement.

9: Could not be assessed.

If P2a = 0, write “Not applicable” for P2c.

Base your assessment solely on the information presented in the case, the specified orthodontic treatment plan, and the available images. Do not assume any clinical, periodontal, or radiographic finding not specified in the case. Do not independently formulate a different initial orthodontic treatment plan to replace the specified plan.

When assessing the need for periodontal treatment or mucogingival surgery, base your decision not only on current periodontal findings but also on their interaction with planned orthodontic movements. In particular, if reduced periodontal support, gingival recession/mucogingival deficiency, or a finding related to alveolar anatomical boundaries is present, consider the clinical risk arising from this finding in conjunction with the direction and amount of planned movement.

If important information required for a decision is missing, state this explicitly and use code 9 if the relevant variable cannot be assessed. Do not assume the presence of unreported pocket depth, clinical attachment

level, bleeding, keratinized tissue width, gingival phenotype, bone thickness/dehiscence-fenestration, or similar findings.

Provide your results in the following order: S1, S2, S3, S4, P1, P2a, P2b, and P2c.

Provide a single code for S1, S2, S3, S4, P1, and P2a. For P2b, only if P2a = 1, specify one or more required intervention types using the short codes S, B, K, F, V, or D. For P2c, provide a single timing code only if P2a = 1. If P2a = 0, write “Not applicable” for P2b and P2c.

For each decision, briefly justify the key periodontal and orthodontic finding influencing your decision. Where possible, explicitly state the clinical relationship between the current periodontal finding and the planned orthodontic movement in your rationale.

For orthodontist AI assessment

Act as an experienced orthodontist. Assess the synthetic orthodontic–periodontal case to be presented below, jointly considering the clinical information, orthodontic and periodontal findings, specified orthodontic treatment plan, and available clinical/radiographic images.

Conduct your assessment from an orthodontist’s perspective, based on the orthodontic treatment plan specified in the case. Assess the direction, amount, and biomechanical characteristics of planned orthodontic tooth movements together with periodontal findings to determine the feasibility of initiating orthodontic treatment from a periodontal perspective (S1), risk of adverse periodontal effects during orthodontic treatment (S2), need for an orthodontic approach adapted to periodontal conditions (S3), confidence in your clinical assessment (S4), whether periodontal findings require modification of the content of the specified orthodontic treatment plan (O1a), the type of modification if required (O1b), and the impact of periodontal requirements on orthodontic treatment timing or sequencing (O2).

When assessing periodontal findings, consider not only their current status but also their relationship to the orthodontic tooth movements envisaged in the specified treatment plan and the risks and limitations these movements may pose with respect to the biological/anatomical boundaries of periodontal tissues.

S1 – Feasibility of initiating orthodontic treatment from a periodontal perspective

0: Can be initiated directly

1: Can be initiated with close periodontal monitoring

2: Can be initiated after periodontal intervention/stabilization

3: Not appropriate under current periodontal conditions

9: Could not be assessed

S2 – Risk of adverse periodontal effects during orthodontic treatment

0: Minimal risk – No clinically significant risk of adverse periodontal effects is anticipated.

1: Low risk – There is a risk of transient and reversible periodontal changes.

2: Moderate risk – There is a risk of clinically significant periodontal changes, such as gingival recession and/or periodontal pocket formation or deepening of existing pockets.

3: High risk – Clinical attachment and/or alveolar bone loss that may develop or progress during orthodontic treatment may seriously compromise periodontal support and tooth prognosis, potentially progressing to tooth loss.

9: Could not be assessed

S3 – Need for an orthodontic approach adapted to periodontal conditions

0: No specific orthodontic adaptation is required from a periodontal perspective

1: Controlled application of orthodontic forces is required, taking periodontal conditions into account

2: The direction of orthodontic movement must be determined with consideration of the biological/anatomical boundaries of periodontal tissues

3: Both controlled application of orthodontic forces and determination of movement direction with consideration of the biological/anatomical boundaries of periodontal tissues are required

9: Could not be assessed using the available data

S4 – Confidence level in the clinical assessment

0: Low – I have limited confidence in my clinical assessment

1: Moderate – I am moderately confident in my clinical assessment

2: High – I am highly confident in my clinical assessment

3: Very high – I am completely or almost completely confident in my clinical assessment

9: Could not be assessed

O1a – Need for plan modification

0: Modification not required

1: Modification required

9: Could not be assessed

O1b – Type of plan modification required

Assess only if O1a = 1. Multiple options may be specified. Report the applicable options using the following short codes:

M: Limitation of the amount of planned tooth movement

Y: Modification of the direction of planned tooth movement

K: Avoidance of specific orthodontic movement(s)

B: Modification of force magnitude and/or biomechanics

A: Modification of the anchorage approach

H: Modification or limitation of orthodontic treatment objectives

Ç: Modification of the extraction/tooth preservation plan

D: Other

If multiple plan modifications are required, specify the corresponding short codes together (e.g., M, Y, B). If O1a = 0, write “Not applicable” for O1b. The O1b short codes are identical to the quick scoring codes in the new form.

O2 – Impact of periodontal requirements on orthodontic treatment timing and sequencing

0: No change in timing/sequencing required – Orthodontic treatment can proceed without periodontal-related delay or specific changes in sequencing.

1: Concurrent periodontal coordination required – No delay is required; periodontal monitoring/care must be conducted concurrently with orthodontic treatment.

2: Postponement of a specific orthodontic stage required – Orthodontic treatment can be initiated; however, a specific movement/stage must be deferred until after periodontal assessment or intervention.

3: Postponement of orthodontic treatment initiation required – Orthodontic treatment must not be initiated until periodontal treatment/stabilization is complete.

9: Could not be assessed – The information provided is insufficient to make a timing/sequencing decision.

Base your assessment solely on the information presented in the case, the specified orthodontic treatment plan, and the available images. Do not assume any clinical, periodontal, or radiographic finding not specified in the case. Do not independently formulate a different initial treatment plan to replace the plan provided in the case. If you consider modification of the provided treatment plan necessary because of periodontal findings, indicate this under O1a and O1b.

If important information required for a decision is missing, state this explicitly and use code 9 if the relevant variable cannot be assessed.

Provide your results in the following order: S1, S2, S3, S4, O1a, O1b, and O2. Provide a single code for S1, S2, S3, S4, O1a, and O2. For O1b, only if O1a = 1, specify one or more required types of plan modification using the short codes M, Y, K, B, A, H, Ç, or D. If O1a = 0, write “Not applicable” for O1b. For each decision, briefly justify the key clinical finding influencing your decision.