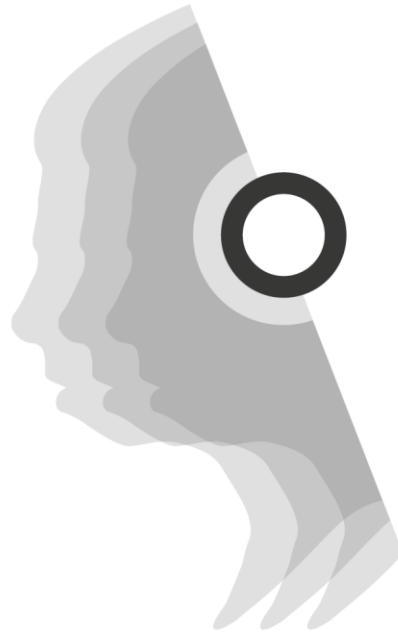


**ONLINE SUPPLEMENTARY MATERIAL**

**Standardizing the Clinical Orofacial Examination in Juvenile Idiopathic Arthritis: An Interdisciplinary, Consensus-based, Short Screening Protocol**



**TMJaw**

TEMPOROMANDIBULAR JOINT JUVENILE ARTHRITIS WORKING GROUP

**General information:**

This form consists of two sections:

**Part 1.** Medical history

**Part 2.** Physical findings

**Part 1: General information**

(To be filled out by the clinician)

**Date:**

**Examiner:**

**Patient ID:**

**Age (yyyy, mm):**

**Age at onset of JIA ( yyyy, mm):**

**JIA subtype:**

<input type="checkbox"/>	Oligoarticular persistent	<input type="checkbox"/>	Oligoarticular extended
<input type="checkbox"/>	Psoriatic	<input type="checkbox"/>	Systemic
<input type="checkbox"/>	RF-negative polyarticular	<input type="checkbox"/>	RF-positive polyarticular
<input type="checkbox"/>	Enthesitis Related Arthritis (ERA)	<input type="checkbox"/>	Undifferentiated
<input type="checkbox"/>	Subtype not confirmed		

**Examination schedule:**

	Date day/month/year		
<input type="checkbox"/>	Routine clinical examination	-- / -- / ----	
<input type="checkbox"/>	BI: Baseline information (pre-intervention)	-- / -- / ----	
<input type="checkbox"/>	T0: Intervention	-- / -- / ----	BI – T0 ___ weeks
<input type="checkbox"/>	T1: Follow up 1 post-intervention	-- / -- / ----	T0 – T1 ___ weeks
<input type="checkbox"/>	T2: Follow up 2 post-intervention	-- / -- / ----	T1 – T2 ___ weeks
<input type="checkbox"/>	T3: Follow up 3 post-intervention	-- / -- / ----	T2 – T3 ___ weeks
<input type="checkbox"/>	T__ Follow up		

**Current medication and dosage (name of drug, dosage used and duration of therapy):**

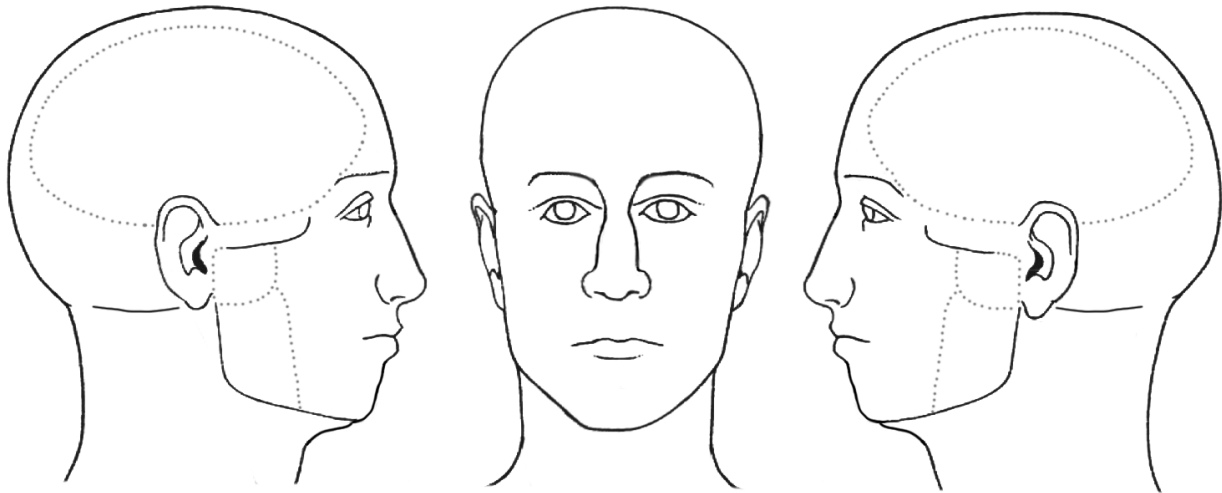
	Name	Dosage	Start Date	End Date
<input type="checkbox"/>	No medication			
<input type="checkbox"/>	NSAID			
<input type="checkbox"/>	Analgesics (e.g. Acetaminophen)			
<input type="checkbox"/>	DMARDs (e.g. Methotrexate)			
<input type="checkbox"/>	Biologics			
<input type="checkbox"/>	Systemic corticosteroids			
<input type="checkbox"/>	TMJ intra-articular corticosteroids			
<input type="checkbox"/>	Other:			

## **Part 2 - TMJ Clinical Examination Form**

(To be filled out by the clinician)

### **1. Clinician-assessed pain location:**

Ask the patient to use his/her finger to point out all the locations of facial pain within the last 2 weeks. *Please* mark an “X” to indicate these areas on the face-map (Note: to be filled out by the clinician, not the patient).



No orofacial pain within the last two weeks

### **2. TMJ pain on palpation:**

Please indicate if the following clinical findings are present:

Pain on palpation with mouth closed:

- None
- Right TMJ
- Left TMJ
- Bilateral TMJs

Pain on palpation with mouth opened:

- None
- Right TMJ
- Left TMJ
- Bilateral TMJs

### **3. Mandibular deviation at maximal mouth opening ( $\geq 3$ mm deviation):**

- Mandibular deviation to the right
- Mandibular deviation to the left
- No deviation/deviation less than 3 mm

#### 4. Maximal unassisted mouth opening:

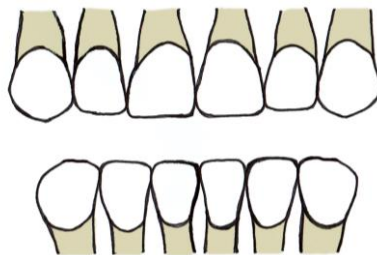
(Maximal unassisted mouth opening = Maximal incisal opening + Vertical incisal overlap)

Maximal incisal opening\*: \_\_\_\_\_ mm

Vertical incisal overlap: + \_\_\_\_\_ mm

Maximal unassisted mouth opening: = \_\_\_\_\_ mm

\*In order to improve reproducibility please put an “x” to mark the teeth and the position on the teeth used for the measurement.

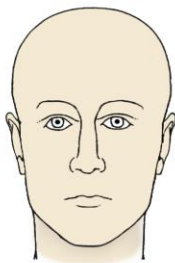


#### 5. Frontal facial asymmetry:

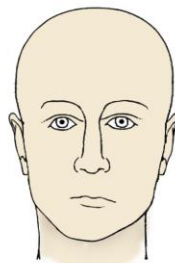
Symmetric mandible

Asymmetric deviation to the right (the right side is smallest)

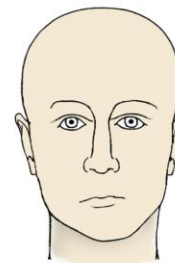
Asymmetric deviation to the left (the left side is smallest)



Symmetric



Asymmetric deviation  
to the right



Asymmetric deviation  
to the left

#### 6. Facial profile:

Choose the picture that best matches the patient’s facial profile.



Straight

Mild convex

Moderate  
convex

Convex  
micrognathic

## **Instructions**

### **General Information**

- Please complete all items for Part 1 (Patient information) and Part 2 (TMJ clinical examination).
- If the patient declines or is unable to comply with the examination, please enter NA (Not Available) in the appropriate space(s).

### **Part 1: Patient information - To be filled out by clinician**

- Complete every item carefully.
- Try to be as accurate as possible about patient's current age, and age at time of JIA diagnosis.
- It is preferable for baseline information to be as close to the time of a treatment intervention as possible.

### **Part 2: TMJ clinical examination – To be filled out by clinician**

#### **Item 1: Clinician-assessed pain location**

- Ask the patient if he/she has felt orofacial pain within the last two weeks. If the answer is “Yes”, ask the patient to point out each area where orofacial pain has been experienced. Emphasize that all areas should be identified.
- Please mark each identified area with an **X** on the corresponding face-maps.

If the answer is “No”, please document this with an **X** in the appropriate box below the face-maps.

#### **Item 2: TMJ pain with palpation**

Note: there is a distinct difference between discomfort and pain. Please document pain only, and NOT discomfort. Verify with the patient that reported pain is similar to pain that the patient has experienced previously, and has discussed during their clinical interview. This will help the patient to differentiate between familiar pain and discomfort from palpation.

- Using the tip of the index finger, identify the temporomandibular joint, which is anterior to the tragus of the ear.
- When the index finger is properly positioned, ask the patient to slowly open and close their mouth in order to localize the precise position of the lateral pole of the mandibular condyle.

#### **Closed-mouth TMJ palpation:**

- After localizing the TMJ, ask the patient to close their mouth, but avoid contact between the upper and lower teeth.
- Palpate the TMJs with a pressure of 0.5-1.0 kilograms.

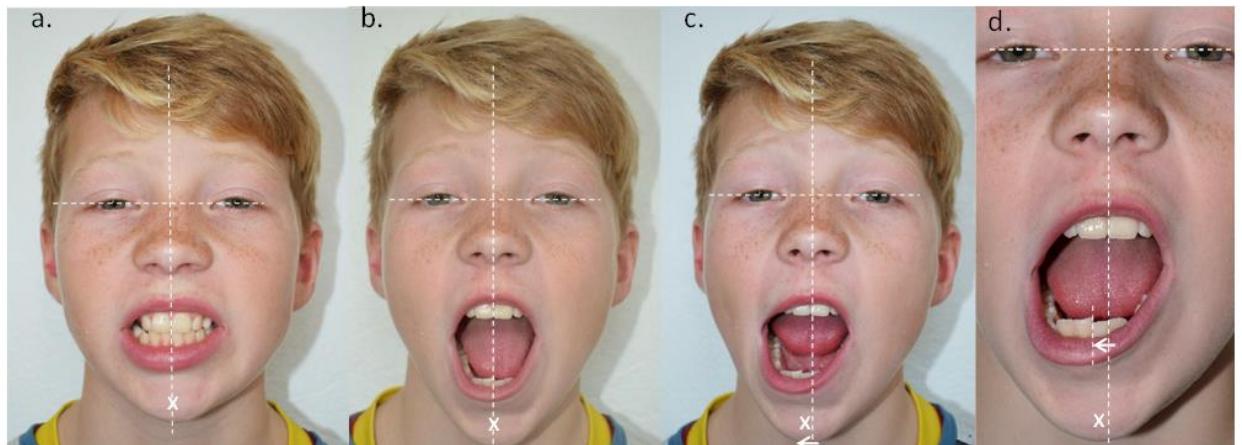
- Ask the patient about pain. Only document pain if the patient reports that the symptoms they feel are comparable to what they typically associate with their previous experience of orofacial pain (“familiar pain”). This helps to distinguish TMJ pain from other sources of pain or discomfort.

#### **Open- mouth TMJ palpation:**

- Position the tip of the index finger over the TMJ
- Ask the patient to open their mouth “*to just before their widest point of opening*”, and maintain this position.
- While the mouth is open, apply firm pressure over the lateral pole of the mandibular condyle (0.5-1.0 kilograms).
- Ask the patient about pain. Only document pain if the patient reports that the symptoms they feel are comparable to what they typically associate with previous experiences of orofacial pain (“familiar pain”).

### **Item 3: Mandibular deviation with maximal mouth opening.**

- Ask the patient to position the mandible so that the posterior teeth are in contact (in occlusion; figure 1a).
- Notice any dental and/or chin-point midline deviation in the closed- mouth position using the inter-pupillary line as reference (figure 1b). Assess the mid chin-point in relation to a reference vertical midline point, which is perpendicular to the inter-pupillary line. Use this vertical midline as your reference during the following assessment.
- Ask the patient to open their mouth as wide as possible, even if this causes pain or discomfort.
- Ask the patient to maintain this position, with the mandible at the maximal mouth opening end point.
- Using the dental midline and/or chin-point in relation to the vertical midface reference line, document whether the mandible is centered, or if it has deviated to the left or to the right of the vertical midface reference line. (figure 1bc).
- Only deviations  $\geq 3$  mm are defined as mandibular deviation (figure 1d).
- Note: Mandibular deviation should only be assessed when the mandible has reached its maximal mouth opening end-point, and not *during* mouth opening.
- Corrected mandibular deviations are recorded as ‘no deviation’. A corrected deviation is defined as: mandibular lateral excursion during mouth opening that returns to midline at maximal mouth opening. This means that the mandible does not deviate from the vertical reference midline at maximal mouth opening (Figure 1ab).
- Mandibular deviation should be assessed three times. Only record deviations that occur more than once during the three assessments.



**Figure 1.** Mandibular deviation at maximal end point. a) Teeth are in contact. Assess the chin-point (indicated by an “x”) in relation to a vertical reference midline perpendicular to the inter-pupillary line. b) No mandibular deviation at maximal mouth opening. Notice how the chin-point corresponds with the vertical reference midline. c) Mandibular deviation to the right side at maximal mouth opening. The chin-point deviates to the right and no longer corresponds with the vertical reference midline. d) Close-up of mandibular deviation to the right side at maximal mouth opening. Notice how both the lower dental midline and the chin reference-point are deviated to the right.

#### **Item 4: Maximal unassisted mouth opening (Figures 2-7).**

Determination of actual maximal mouth opening requires information about two variables:

- a) The maximal incisal opening,
- b) The vertical incisal overlap in the closed-mouth position.

##### **The maximal incisal opening (figure 2)**

- Ask the patient to open up their mouth as much as possible three times as a warm-up exercise.
- Then, ask the patient to open their mouth as much as possible, even if he/she feels pain or discomfort.
- Place a ruler on the incisal edge of the lower right incisor and record the number of millimeters measured between the lower right and upper right incisal edge (Figure 2).
- Note: It is important for the examiner to instruct the patient to open as wide as possible, since patients tend to open until they feel discomfort or pain without reaching their maximal mouth opening capacity. In the case of missing incisors, use the right canines for assessment of maximal mouth opening





**Figure 2.** Maximal incisal opening of 43 mm

**Vertical incisal overlap (figure 3).**

- The mandible should be in a position where the teeth are in contact



**Figure 3.** Closed mouth position with teeth together (in occlusion)

- In the closed-mouth position, assess the vertical incisal overlap. Position your thumb under the incisal edge of the central upper incisors (figure 4) and ask the patient to open their mouth. Measure the amount of overlap with a ruler (figure 5). Record this amount on the form. Always measure the distance between the two incisal points that have the greatest overlap (deepest overbite).



**Figure 4.**



**Figure 5.**

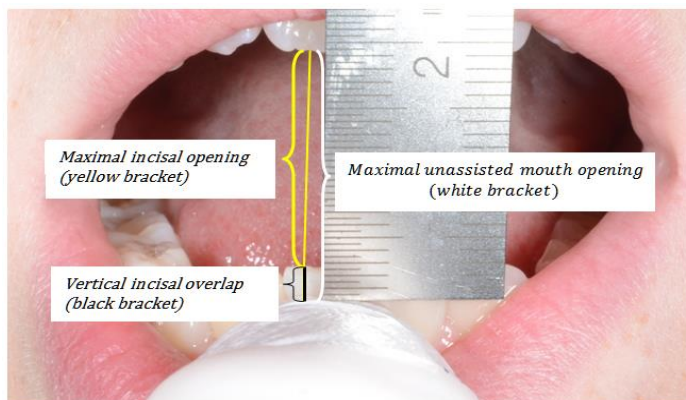
- In case of an anterior open bite (missing overlap of the incisors), assess the vertical incisal distance as follows:
- Use a ruler to measure the opening between the upper and the lower incisors with the posterior teeth in contact (figure 6). Document the number of millimeters between the incisal edges with a negative digit. (e.g. -2 mm).



**Figure 6.** Open bite with missing incisal overlap (yellow line)

**Calculate the maximal unassisted mouth opening as follows:**

Maximal unassisted mouth opening = maximal incisal opening + vertical overlap



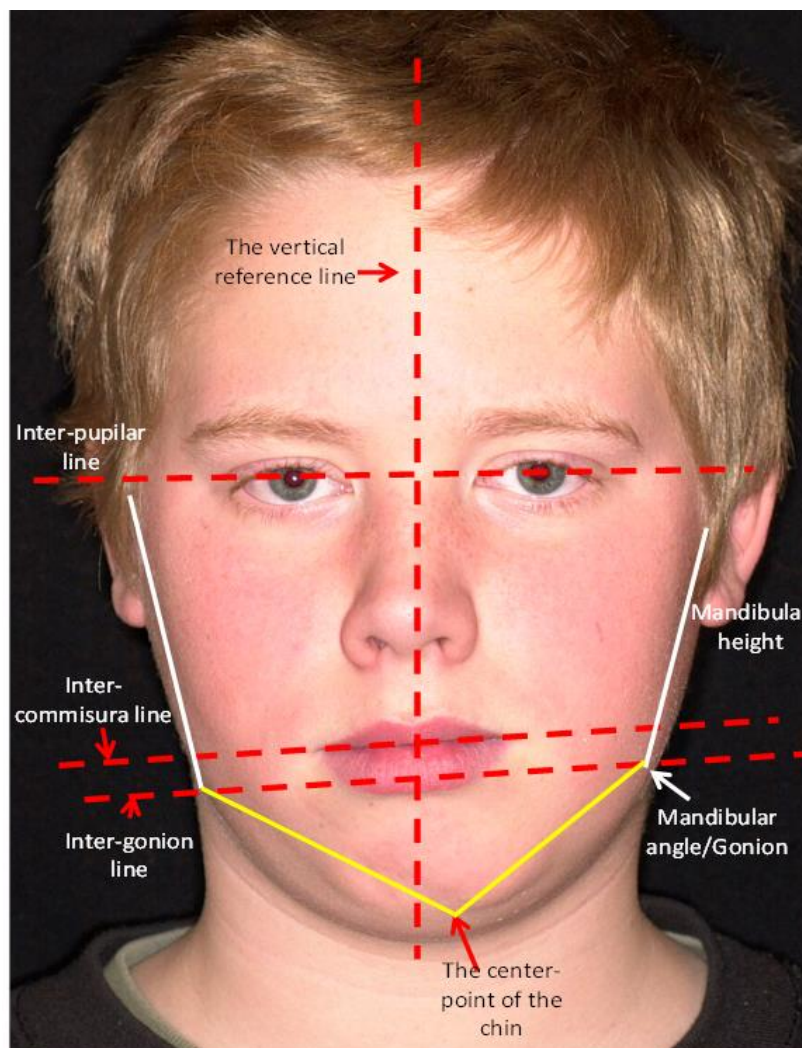
**Figure 7.** Calculation of maximal unassisted mouth opening capacity. The maximal incisal opening is 16 mm (yellow bracket); The vertical incisal overlap is 3 mm (black bracket). The maximal unassisted mouth opening of this patient is 16 mm + 3 mm = 19 mm (yellow bracket + black bracket = white bracket). NB: If the patient had

an anterior open bite of -2 mm, the maximal unassisted mouth opening of this patient would be: 16 mm + -2mm = 14 mm.

### Item 5: Frontal facial asymmetry (figure 8).

Assess these variables with the patient positioned in front of you:

- Ask the patient to sit upright with a natural head posture, the mouth closed, and the lips relaxed.
- Position your index fingers over the mandibular angle (gonion point) on each side (Figure 8, white arrow).
- Use the position of the index fingers to assess any noticeable left-right difference in mandibular ramus height (white lines) with reference to the inter-pupillary line.
- Assess if the inter- commissural line and/or the inter-gonion line are parallel to the inter-pupillary line. If not, this indicates facial asymmetry.
- Based on these findings, record any evidence of mandibular asymmetry.
- NB. It is important to recognize that this protocol can only provide a clinical assessment of dentofacial skeletal asymmetry. A thorough assessment of skeletal dentofacial deformity requires radiological assessment of variables of dentofacial growth, occlusal development and dentoalveolar relations.



**Figure 8.** Assessment of facial symmetry.

- Identify inter-side differences in the position of the mandibular angle (white arrow): the point of intersection between the vertical (white lines) and the horizontal (yellow lines).
- Identify any inter-side difference in the mandibular ramus height (white vertical lines): the distance between the TMJ and the mandibular angle.
- Use the red dotted reference lines to assess dentofacial canting/frontal asymmetry.
- Use the vertical reference line to assess any deviation of the chin point

In figure 8: Note the obvious left sided facial asymmetry illustrated by:

- i. Left side canting of the inter-commissural /inter-gonion lines in relation to the inter-pupillary reference line.
- ii. Reduced mandibular ramus height in the left side
- iii. Deviation of the chin-point to the left of the vertical reference line.
- iv. A chin-point deviation to the left in relation to the vertical reference line.

NB. A chin point deviation in relation to the vertical reference line is not always obvious in JIA patients despite the presence of dentofacial deformity.

**Item 6: Facial Profile (Figure 9):**

- Ask the patient to sit upright with a natural head posture, the mouth closed, and the lips relaxed.
- Document the patient’s facial profile-type, using the illustrations provided as a reference.

