SHAPE THE FUTURE

Working Protocol: Dental Assistant – Orthodontist Collaboration Algorithm

A Digital and Clinical Reference for Dental Assistants Working with Orthodontists

Prepared: 2026

Prepared by: Shape the Future project students and coordinators

Project: Empowering Dental Assistants through Digital Innovation in Orthodontics

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This is the original English-language document. Translations are available in Estonian, Latvian, and Lithuanian.

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1. Introduction and Purpose

1.1 Purpose of This Protocol

This protocol has been developed within the Shape the Future project to standardize the knowledge and working procedures required of a dental assistant supporting an orthodontist. It brings together the theoretical foundation of orthodontics, the diagnostic and clinical workflow used in an orthodontic practice, and the digital tools (intraoral scanning and case-submission software) that a modern dental assistant is expected to operate confidently.

Nowadays, it is hard to imagine a modern dental clinic operating without a knowledgeable and competent assistant. With the advent of new technologies and an expanded range of materials and instruments, the role of the assistant - the orthodontist's right hand - has become increasingly important. A competent and experienced assistant ensures time efficiency during appointments, higher quality of clinical work, and greater comfort for the patient.

1.2 Scope

The protocol covers: (1) the theoretical fundamentals of orthodontics and the classification of malocclusion and related pathologies that the assistant must be able to recognize; (2) the diagnostic methods used to assess a patient before and during orthodontic treatment; (3) the instruments and appliances used in orthodontic treatment; (4) the operation, care, and sterilization of the 3Shape TRIOS 4 intraoral scanner; and (5) the digital case-submission workflow through the Ordoline system, including the clinical photographic protocol required for each case.

1.3 Audience and Use

This document is written for dental assistants trained under the Shape the Future project. It is designed to be translated, without loss of technical accuracy, into Lithuanian and Latvian for use by partner organizations. All specialized terminology used throughout the protocol is collected in the Glossary (Section 9) to support consistent translation.

1.4 How This Protocol Was Developed

This protocol was not written by a single author. It was developed collaboratively over the course of three Shape the Future project meetings, through hands-on workshops held with students in Tallinn, Estonia. After each topic was taught, students discussed and identified which points were essential to include in the working protocol, so that the final document reflects what dental assistants themselves consider most necessary in daily practice. Coordinators explained this collaborative approach to students at the very start of the project: the protocol would be built together with them, keeping only the most necessary and practical content.

All contributions gathered from these workshops were then compiled and structured into this single document, with AI-assisted drafting support. Before approval, the draft protocol was circulated to all partner organizations, each of which was given the opportunity to review the content and submit final corrections.

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2. Roles and Responsibilities Overview

Before an appointment, the orthodontist and dental assistant confirm the plan for the visit together. The table below summarizes the core areas of responsibility. Detailed step-by-step procedures for diagnostics, scanning, and digital case submission are provided in Sections 4, 7, and 8.

Area	Orthodontist	Dental Assistant
Diagnosis & Planning	Diagnoses bite anomalies and jaw irregularities; defines the treatment plan; monitors treatment progress.	Gathers and prepares diagnostic records (photographs, scans, X-rays) for the orthodontist's review.
Appliances	Prescribes, installs, and adjusts orthodontic appliances (braces, aligners, etc.).	Prepares instruments and materials; assists chairside during installation and adjustment.
Digital Workflow	Reviews and approves the digital case, defines the treatment plan in Ordoline.	Performs or assists the intraoral scan, takes the clinical photo set, and uploads the case to the Ordoline portal.
Patient Communication	Explains diagnosis, treatment plan, and clinical decisions to the patient.	Explains practical matters: aligner/ appliance wear schedule, hygiene routine, and logistics.
Complex Cases	Leads treatment of skeletal anomalies, cleft lip/palate, and surgical cases, in cooperation with surgeons.	Supports preparation and documentation for specialist referrals as instructed.

3. Introduction to Orthodontics

3.1 What Is Orthodontics?

Orthodontics (from the Greek orthos - "straight", and odontos - "tooth", literally "the straightening of teeth") is a branch of dentistry that studies the etiology, diagnosis, prevention, and treatment of dentoalveolar anomalies and deformities.

3.2 What Does an Orthodontist Do?

- Diagnoses and plans treatment for bite anomalies and jaw irregularities, including temporomandibular joint (TMJ) dysfunction, at any age.
- Installs and adjusts orthodontic appliances (braces, aligners, and others).
- Monitors treatment progress over time.
- Carries out pre-operative treatment for cleft lip and palate.
- Treats skeletal anomalies, including orthognathic surgery cases.
- Performs and participates in surgical procedures that correct jaw and facial skeletal deformities.
- Collaborates with maxillofacial surgeons in planning and carrying out corrective operations.

3.3 What Orthodontics Involves

- Treatment and prevention of temporomandibular joint (TMJ) dysfunction.
- Correction of all types of malocclusion.
- Treatment of skeletal anomalies in cooperation with maxillofacial surgeons.
- Preparation for orthognathic surgery.

3.4 Main Branches of Orthodontics

Branch	Focus
Gnathology	Treatment and prevention of temporomandibular joint (TMJ) dysfunction.
Orthognathics & Orthognathic Surgery	Treatment of skeletal bite anomalies in cooperation with maxillofacial surgeons.
Pediatric Orthopedics, Orthodontics & Reconstructive Surgery	Treatment of cleft lip and palate, TMJ ankylosis, Pierre Robin sequence, and Treacher Collins–Franceschetti syndrome (specialized care).
Pediatric Orthodontics	Treatment with removable and fixed appliances for children; early correction of all types of malocclusion.

Branch	Focus
Adult Orthodontics	Treatment with braces and aligners; correction and management of all types of malocclusion in adults; preparation for prosthetic treatment.

4. Types of Malocclusion and Related Pathologies

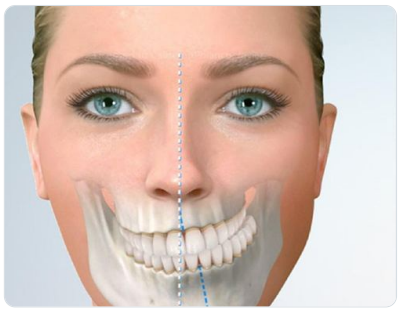
4.1 What Is an Ideal Bite?

A normal bite type is called an orthognathic bite. It not only ensures aesthetic harmony but also proper functioning of chewing, speech, and swallowing.

4.2 Types of Malocclusion

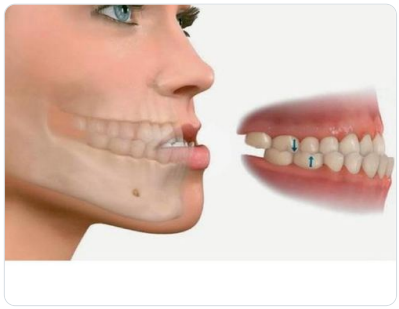
Abnormal forms of occlusion affect facial and smile aesthetics, as well as essential functions such as chewing, swallowing, and speech, to varying degrees. The pathological types of bite are: distal, mesial, deep, open, and crossbite. The dental assistant should be able to recognize each type visually and understand its clinical significance, in order to support accurate record-keeping and patient communication.

Type	Clinical Description	Typical Impact
Distal Bite	A common bite defect in children and adolescents in which the upper jaw is positioned forward relative to the lower jaw.	Issues with diction, chewing, and breathing.
Mesial Bite (Mesial Occlusion)	The lower jaw dominates the upper jaw; the front tooth rows fail to close correctly.	Enamel wear, changes in facial expression; may be genetic or environmental in origin.
Open Bite	The upper and lower teeth do not close together, creating a gap between the jaws.	Interferes with lip closure and chewing.
Crossbite	Several lower teeth overlap parts of the upper jaw, or vice versa.	Often originates during fetal development or from childhood habits.
Deep Bite	The upper front teeth almost completely cover the lower ones.	Distorts facial proportions, affects speech, accelerates tooth wear, may injure soft tissue.



Crossbite

Distal Bite



Mesial Bite

Open Bite

Deep Bite

4.3 Cleft Lip and Palate

Cleft lip and palate are congenital anomalies that occur when the tissues of the lip and/or the roof of the mouth (palate) do not fuse properly during early fetal development. These conditions can occur separately or together, and their severity can vary. They may cause difficulties with feeding, speech, hearing, and dental development. Treatment typically requires a multidisciplinary approach, including surgical correction, orthodontic care, and speech therapy; the orthodontist plays a vital role in aligning the teeth and jaws as part of the overall treatment plan.

4.4 Associated Syndromes

Pierre Robin Sequence

A rare congenital anomaly characterized by a triad of features: micrognathia (underdeveloped lower jaw), glossoptosis (downward or backward displacement of the tongue), and cleft palate. These abnormalities may cause feeding difficulties, breathing problems, and airway obstruction.

Treacher Collins Syndrome

Also known as mandibulofacial dysostosis or Treacher Collins–Franceschetti syndrome, this is a genetic (sometimes hereditary) disorder characterized by deformities of the facial bones and soft tissues. It occurs in approximately 1 out of every 50,000 newborns. Treatment requires a comprehensive approach: restoring breathing and swallowing functions, correcting facial deformities, and restoring hearing.

Goldenhar Syndrome

A congenital condition involving abnormal development of the first and second pharyngeal (branchial) arches, affecting the development of the ear, jaw, and facial structures, often asymmetrically.

5. Diagnostic Methods

Diagnosing a patient with a dental or jaw anomaly relies on two complementary categories of methods.

5.1 Clinical Examination

Clinical methods are applied chairside and include: patient interview and history-taking, visual inspection, palpation, percussion, probing, and auscultation.

During visual inspection, attention is given to the patient's body type, physical development, and the shape of the hands and head. The configuration of the face is evaluated, including the prominence of nasolabial and mental folds, smoothness of facial contours, open-mouth posture, protrusion of the alveolar ridge, lips or chin, shortening of the lower third of the face, and facial asymmetry. Palpation is used to assess the muscle tone of the lips and the thickness of the soft-tissue layer.

Palpation of the temporomandibular joints is performed, particularly through the external auditory canals, noting any clicking or crepitus during mouth opening (including whether the click occurs at the beginning or end of opening) and the trajectory of mandibular movement. The oral cavity is then examined.

5.2 Paraclinical Methods

Paraclinical methods include instrumental, laboratory, and radiological examinations: the clinical photo protocol, all types of X-ray/imaging examination, and diagnostic (study) models.

5.3 Radiological Examination

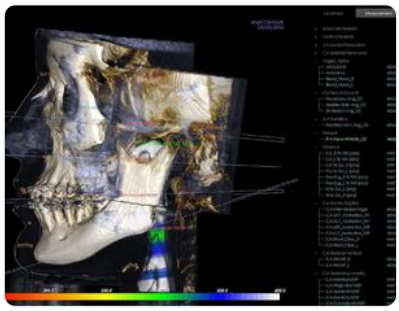
Radiological examination is necessary to clarify the diagnosis, determine the treatment plan and prognosis, and study the changes occurring during a child's growth as well as changes resulting from treatment. Depending on the purpose, it is important to select the most appropriate and effective method.

Method	Purpose
Panoramic radiography (OPG)	Overview of the jaws and dentition.
Temporomandibular joint tomography	Detailed imaging of the TMJ structures.
Cephalometric X-ray (CEPH) - lateral and frontal	Analysis of skeletal and dental relationships for diagnosis and treatment planning.
3D cephalometry	Three-dimensional analysis of craniofacial structures.

Method	Purpose
Hand and wrist radiography	Assessment of skeletal (bone) age and growth stage.
Dental cone-beam computed tomography (CBCT)	High-precision 3D imaging of the dentofacial system; used before implant placement and in orthodontics/gnathology.
Magnetic resonance imaging (MRI) of the TMJ	Detailed soft-tissue and joint assessment.
Intraoral scanner	Digital 3D capture of the dentition and occlusion (see Section 7).

Panoramic Radiography

Cephalometric X-ray



3D Cephalometry

Hand and Wrist Radiography

5.4 Diagnostic (Study) Models

Impressions are taken to accurately reproduce the alveolar ridges and relevant oral structures. Diagnostic models can be obtained in two ways: traditional impressions using silicone or alginate materials, or a modern intraoral scanner that creates a digital 3D model of the patient's dentition. Casts are made from high-strength gypsum and marked with the patient's name, date, and case number. They serve both diagnostic and monitoring purposes, helping with diagnosis, treatment planning, and outcome evaluation.

5.5 Facial Measurements and Photographic Analysis

Various facial measurements are taken in orthodontics - facial type, vertical facial height, mandibular angle values, and the length of the mandibular body and ramus - using calipers and millimeter rulers. Frontal and profile photographs are taken to assess facial configuration before and after treatment: frontal photographs are diagnostically important for evaluating maxillary narrowing, pronounced anterior maxillary protrusion, deep or open bite, and facial asymmetry; profile photographs help determine the severity of anomalies such as distal, mesial, deep, or open bite. The full clinical photographic protocol is described in Section 8.6.

6. Orthodontic Instruments and Appliances

6.1 Standard Instrument Set for the Diagnostic Appointment

- Examination kit
- Impression tools and materials (standard impression trays, impression materials)
- Digital camera (professional DSLR / dedicated dental camera; a smartphone camera is acceptable for quick preliminary shots)
- Intraoral mirror, for photographing the dental arches
- Lip retractor

Intraoral Mirror

Lip Retractor

6.2 Categories of Orthodontic Appliances

Category	Description / Examples
Removable appliances	Used mainly for minor corrections and in early childhood. Examples: Heinz plate, LM-Activator, Schwarz appliance, Twin Block, Andresen–Häupl appliance.
Fixed appliances (braces)	The most common method, providing precise tooth movement. Vestibular or lingual bracket systems, ligating or self-ligating.
Clear aligners (e.g. Ordoline)	Removable, custom-made transparent trays for discreet correction; see Section 8.
Functional appliances	Correct jaw position and guide growth in children. Includes facebows, face masks, and chin cups.
Orthodontic retainers	Maintain treatment results after the active phase; removable or fixed.
Gnathological and orthopedic splints	Individual gnathological splints, therapeutic-diagnostic splints, bruxism splints (hard/soft), sports mouthguards.
Micro-screws (mini-implants)	Provide skeletal anchorage for complex tooth movements.

LM-Activator

Schwarz Appliance

Chin Cup

Gnathological Splint

Therapeutic-Diagnostic Splint

6.3 Fixed Appliances (Braces) - Components

A fixed bracket-arch appliance (bracket system) consists of brackets bonded to the teeth with composite material, an orthodontic archwire seated horizontally in the bracket slots, and a fixation method - ligatures in conventional brackets, or built-in clips/covers in self-ligating brackets. By placement, appliances are vestibular (front/labial surface) or lingual (inner/oral surface). By material, brackets may be metal, ceramic, sapphire, plastic, or combined.

Two standard bracket slot sizes are commonly used: 0.018 in (0.46 × 0.72 mm) and 0.022 in (0.56 × 0.72 mm). Different bracket systems (Roth, Alexander, Damon, MBT, and others) use slightly different slot angulations based on their own biomechanical concepts. Orthodontic bands, cemented onto molars, come in sizes matched to tooth dimensions and carry either a soldered bracket or a tube for the archwire.

Archwire Materials

Archwires are made from stainless steel, nickel-titanium, copper-nickel-titanium, or titanium-molybdenum alloys. Treatment typically starts with thin, flexible round wires and progresses to thicker rectangular wires as treatment advances, so that the wire more fully fills the bracket slot and provides precise tooth positioning.

Auxiliary Components

- Elastic and metal ligatures - secure the archwire in the bracket slot.
- Elastic ("ZOO") force rings - latex rings used to apply force to a tooth, group of teeth, or the whole arch.
- Orthodontic springs - close gaps (diastemas) or create space in the arch.
- Elastic chains - apply continuous force to move one or several teeth.
- Elastic separators - create space between teeth before band placement.

6.4 Debonding and the Retention Phase

After the retention period, bracket removal is performed using an examination kit, bracket-removing pliers, band-removing pliers, adhesive-removal pliers, and a handpiece with polishing burs, discs, brushes, and fluoride polishing paste. The retention phase that follows may last several years; its purpose is to passively maintain the results achieved, using removable or fixed retention appliances.

6.5 Oral Hygiene Products for Orthodontic Patients

- Toothpaste
- Mouthwash
- Orthodontic toothbrush (with a longitudinal groove for cleaning around brackets)
- Dental floss for interdental spaces
- Interdental brush for cleaning around brackets and under archwires
- Floss threader

6.6 Bonding Materials and Procedure

Bonding a fixed appliance is a precise, multi-step chairside procedure in which the dental assistant plays an active supporting role:

- Isolation and drying: the arch is isolated with cheek retractors and cotton rolls/dry-field system; the enamel surface must remain completely dry and saliva-free throughout bonding.
- Etching: phosphoric acid gel (typically 35-37%) is applied to the enamel for the manufacturer-specified time, then thoroughly rinsed and the tooth re-dried - the etched surface must appear frosty white.

- Priming: a thin layer of bonding primer/adhesive resin is applied to the etched enamel and to the bracket base.
- Bracket placement: the orthodontist positions each bracket at the correct height and angulation using a bracket positioning gauge; excess adhesive is removed with a scaler before curing.
- Light-curing: a dental curing light polymerizes the adhesive at each bracket, typically a few seconds per surface depending on the light and adhesive used.
- Archwire insertion: once all brackets are bonded, the first archwire is seated into the slots and secured with ligatures or self-ligating clips.

> Note: Moisture contamination at any stage (etching, priming, or bonding) is the most common cause of bracket bond failure and unplanned emergency visits - the assistant's isolation and suction technique is critical to a successful bonding appointment.

6.7 Chairside Adjustment Instruments

At each activation/adjustment visit, the orthodontist changes or reactivates the archwire and auxiliary components. The dental assistant prepares and hands over the following instruments:

Instrument	Purpose
Weingart pliers	Insert, seat, and remove archwires from the bracket slots; general-purpose wire-holding pliers.
Bird-beak pliers	Form precise bends and loops in round or rectangular archwire.
Three-jaw (loop-forming) pliers	A plier with two outer jaws and a central jaw, used to form precise loops, springs, and rectangular bends in heavier archwire.
Adams pliers (universal pliers)	Bend and adjust the Adams clasps and other retentive wirework on removable appliances, facebows, and headgear.
How (utility) pliers	A general-purpose plier with smooth, flat-and-rounded beaks used for a wide range of small bending and holding tasks at the chairside.
Distal-end cutter	Trim excess archwire flush with the last molar tube, holding the cut fragment to prevent it from being dropped or swallowed.
Ligature wire cutter	Cut soft steel ligature wire to length, distinct from the heavier distal-end cutter used on the archwire itself.
Ligature-tying pliers (Mathieu)	Twist and place steel ligature wires around bracket wings.
Ligature director / scaler	Tuck ligature ends and remove excess bonding adhesive.
	Seat orthodontic bands fully onto the molar during fitting.

Instrument	Purpose
Band pusher / band seater	
Bracket positioning gauge	Verify correct height placement of each bracket before curing.
Bracket- and band-removing pliers	Used at debonding to release brackets and bands without damaging enamel (Section 6.4).

6.8 Instruments for Temporary Anchorage Devices (Mini-Implants)

Mini-implants (temporary anchorage devices, or TADs) are small titanium screws placed into the jawbone to provide fixed skeletal anchorage for complex tooth movements. Placement is performed by the orthodontist, with the dental assistant preparing and passing the following instruments:

- TAD driver (manual or contra-angle handpiece attachment): engages the head of the mini-implant and drives it into the prepared site under controlled torque.
- Pilot drill: used in denser bone to create a small starter channel before the self-drilling mini-implant is placed.
- Depth/length gauge: confirms the mini-implant length matches the available bone thickness at the planned site before placement.
- Topical or local anesthetic kit: used by the orthodontist to anesthetize the soft tissue and periosteum at the placement site.

> Note: The assistant's role is chairside support, patient comfort, and instrument handling; mini-implant placement and removal is performed exclusively by the orthodontist.

6.9 Interproximal Reduction (IPR) Instruments

Interproximal reduction (IPR), also called enamel stripping or reproximation, removes a small, controlled amount of enamel between teeth to relieve crowding or create space, particularly common in aligner cases. Instruments used include:

- Manual IPR strips: thin, abrasive metal or diamond-coated strips of graduated grit, passed by hand between the contact points to reduce enamel.
- Motorized IPR discs/strips: diamond-coated discs or oscillating strips fitted to a handpiece for faster, more controlled stripping.
- IPR gauge (thickness gauge): measures the amount of enamel removed at each contact point to keep it within the orthodontist's planned limit.
- Polishing strips and fluoride varnish: smooth and remineralize the stripped enamel surface after reduction.

> Note: The amount of enamel removed at any contact point is planned by the orthodontist in advance and must not be exceeded, since interproximal enamel does not regenerate.

6.10 Emergency and Troubleshooting Kit

Minor orthodontic emergencies are common between scheduled visits. The assistant should keep a small kit on hand for same-day management:

- Orthodontic relief wax - applied over a poking wire end, loose bracket, or irritated soft tissue for immediate patient comfort.
- Distal-end cutter and ligature-tying pliers - to trim a protruding wire end or replace a lost ligature chairside.
- Spare ligatures, elastic modules, and a bonding kit - for re-securing a wire or re-bonding a loose bracket.
- Topical anesthetic gel (orthodontist-directed use only) - for localized soft-tissue irritation.

> Note: A wire end that is poking the cheek or gum, or a loose bracket/band, should always be assessed the same day - do not advise the patient to simply "wait until the next appointment" without clinician review.

7. Intraoral Scanning Protocol – 3Shape TRIOS 4

7.1 What Is the 3Shape TRIOS 4?

The 3Shape TRIOS 4 is a handheld, wireless intraoral scanner used by dentists and dental assistants to scan a patient's teeth and gums. It generates an immediate 3D model of the teeth, gums, and occlusion, which both the clinician and the patient can view in real time on a screen next to the chair.

7.2 Uses of Intraoral Scanning in Orthodontics

- Fabrication of control-diagnostic models (CDMs) made of plastic.
- Scanning the palate and nasal structures in cleft lip and palate cases, for treatment planning and the fabrication of working models used to design individual nasal stents and prosthetic obturators.
- Treatment planning with aligners and fabrication of working models used to manufacture aligners.
- Fabrication of retention appliances and removable/fixed orthodontic appliances, as well as gnathological and bruxism splints.

7.3 Scanning Technique

Before scanning, dry the teeth well - excess saliva reduces scan quality. Avoid using the dental operating lamp during scanning, as it can interfere with the scan, and allow the scanning tip a moment to reach operating temperature.

Step 1 - Lower Arch (Antagonist)

Start at the occlusion of the first molar and sweep along the occlusion. The recommended scanning path is three sweeps: occlusal, lingual, and buccal. Begin with the molar occlusal surface, hold for 3–5 image captures, then move slowly toward the incisors, wiggling the scanner gently as it passes the central teeth.

Step 2 - Upper Arch

Start directly at the occlusion of the first molar and sweep along the occlusion. Rotate toward the palatal side, then toward the buccal side, and rotate to close to a 90° angle to capture the distal and mesial contact points clearly, then return to the occlusal view.

Step 3 - Bite Registration

Insert the scanner tip at the buccal side of the molars. Ask the patient to bite firmly, and begin scanning from the most distal position, moving slowly forward. Keep roughly 50/50 of the upper and lower teeth visible in the scan area, continuing until the upper and lower scans align

("snap") together. The bite scan should cover at least three to four teeth on each side for reliable alignment, even if the scans appear to align earlier.

Soft-Tissue Control

Use a mouth mirror, lip/cheek retractor, or a finger to keep the tongue, cheek, and lips clear of the scan field, since soft tissue in the scan path reduces accuracy.

7.4 Cleaning and Sterilization of the Scanning Tip

The TRIOS Tip must be cleaned and sterilized immediately after use. New tips must be sterilized or high-level disinfected before their first use.

Method A - Sterilization Using an Autoclave

- Hand-wash the tip with soapy water and a soft brush (a mild dish detergent is recommended). If stains, dirt, or fog remain on the mirror, repeat the cleaning before rinsing with water. Dry the mirror carefully with a paper towel.
- Place the tip in a steam pouch and seal it hermetically (self-adhesive or heat-resistant pouch).
- Sterilize the packaged tip in an autoclave using one of the following programs: 134 °C (273.2 °F) for at least 4 minutes, or 121 °C (249.8 °F) for at least 45 minutes.
- Use an autoclave program that dries the packaged tip before the autoclave is opened.

> Note: Never autoclave an unpackaged tip - this leaves stains on the mirror that cannot be removed. A Class B vacuum autoclave complying with the EN 13060 standard is required. The scanner tip with its attached mirror can be sterilized up to 150 times, after which it must be discarded.

Method B - Cleaning with High-Level Disinfectant

- Hand-wash the tip with soapy water and a brush immediately after use; check the mirror for stains, dirt, or a whitish film and repeat cleaning if necessary. Rinse with water and dry carefully with a paper towel.
- Disinfect the tip by fully immersing it in Wavicide-01 solution for 45–60 minutes, following the solution's user manual.
- After 45–60 minutes, remove and rinse the tip per the Wavicide-01 instructions.
- Dry the tip and mirror with a non-abrasive cloth or towel.

> Note: 3Shape has validated high-level disinfection with Wavicide-01 solution, but it is not globally approved or recognized as a medical-device disinfectant in every jurisdiction. Always follow the procedures established for your clinic or institution and all applicable national guidelines.

7.5 Scanner Calibration

Calibration allows the scanner to calculate its internal geometry and camera parameters correctly. There is no fixed calibration interval, but the general recommendation is to calibrate the scanner once a week.

When Recalibration Is Needed

- The visual quality and/or accuracy of the scans decreases.
- The scanner has been transported or moved to a different surface.
- The last calibration was performed more than 30 days ago (the software will show a recalibration warning).

Before Calibrating

- Do not use calibration objects from a different scanner, even if they look identical.
- Do not calibrate the scanner "cold" - avoid calibrating first thing in the morning if it was off overnight, since the scanner's temperature rises during the day and this can trigger a false recalibration warning.
- Keep the room temperature stable throughout the day; do not place the scanner near a heat source or window.
- Always keep the protective cover on the calibration object when it is not in use, to keep it clean and scratch-free.
- Always use the original calibration object supplied with the scanner - its serial number must match the scanner's serial number.

> Note: If the calibration object is damaged (for example, dropped on the floor), do not attempt to repair it. Contact the equipment supplier to order a replacement.

7.6 Screen Calibration (TRIOS Cart / MOVE / MOVE+)

If the touch sensitivity of the TRIOS Cart / MOVE / MOVE+ monitor is inaccurate, the touchscreen can be recalibrated using 4-point calibration:

- Open the "Screen Calibration" tool: More → Settings → TRIOS → System settings → Screen Calibration.
- Follow the on-screen instructions and touch the cross each time it appears.
- When calibration is complete, a confirmation message appears - press Yes to save the calibration data.

7.7 Troubleshooting - Error Messages

An error may occur due to an excessive number of 3D images captured (the recommended maximum is 3,000 3D images per scanned arch). In this case, the file is most likely

unrecoverable and a new scan must be performed. To avoid this, keep within the recommended image limit, and when scanning more complex areas, use the "lock surface" tool to prevent over-scanning of surfaces that have already been captured.

8. The Ordoline Digital Case-Submission System

8.1 What Is Ordoline?

Ordoline is a next-generation system for orthodontic treatment. It enables digital treatment planning, precise tooth movement, and aesthetic, comfortable aligners. Its technology integrates the full workflow, from intraoral scanning to the manufacturing of individualized aligners, connecting dentists and patients on one side with orthodontists and the Ordoline platform/laboratory on the other, worldwide.

8.2 Step-by-Step System Workflow

- The patient visits a general dental clinic.
- The clinic performs a full diagnostic workflow (intraoral scan, photographs, X-ray/CBCT as required).
- The case is uploaded to the Ordoline portal.
- The orthodontist creates the treatment plan within Ordoline.
- The aligners are manufactured and delivered.
- The complete set is delivered to the clinic; the dentist initiates treatment and provides instructions for aligner wear.

8.3 Features of Ordoline Aligners

- Custom-made, transparent thermoplastic material - durable, comfortable, and virtually invisible.
- Recommended wear time: not less than 22 hours per day.
- Suitable for different levels of treatment, from simple alignment cases to more complex corrections.
- Compatible with digital technologies: 3D scans, virtual treatment planning, and digital modeling.
- Regular check-ups allow the treatment plan to be adjusted so predicted tooth movement matches actual progress.

8.4 Role of the Dental Assistant in the Ordoline Workflow

- Captures high-quality intraoral scans, CBCT, and panoramic X-rays.
- Uploads all necessary data to the Ordoline portal: patient personal data, scans, CBCT files, photographs, and the patient's complaints and wishes.
- Prepares the patient's teeth for scanning/photography.
- Explains the aligner wear schedule to the patient (patient education).

- Manages the logistics of the case (impression/scan delivery method, tracking, communication with the laboratory).

Aligner

8.5 Entering a Case in the Ordoline Portal

8.5.1 Patient Tab - Personal Data

A new case is created via "Create new." The Patient tab collects: clinic name, patient first and last name, phone, email, date of birth, and an optional profile photo.

8.5.2 Images Tab - Impressions Delivery

The "Impressions delivery" field lets the assistant choose how the 3D data will reach Ordoline. Available options include: Send to Ordoline directly, Send through 3Shape, Send through Medit, Send through Sirona, Send through iTero, Send through Shining 3D, Send through Dexis, Send through Straumann AXS, and Send through Straumann Sirios. When the clinic's own 3Shape TRIOS scanner is used, select "Send through 3Shape" - no separate manual export step is required.

The same tab includes three upload sections: Add Pictures, Add X-ray, and Add CBCT.

> Note: CBCT file uploads only support RAR and ZIP archive formats, under 2 GB in size. Ensure the file is in one of these formats and under the size limit before uploading.

8.5.3 Required Photographs (Minimum Set)

Category	Required Views
Extraoral	Facial Frontal (natural smile and resting face); Facial Profile (natural smile and resting face)
Intraoral	Frontal Bite; Right Buccal Bite; Left Buccal Bite; Upper Occlusal View; Lower Occlusal View

8.5.4 Existing Conditions

Before submitting the case, the assistant records the patient's complaints (for example: aesthetic complaint, TMJ symptoms, gingival recession, tooth wear, crowding, spacing, face

asymmetry, smile asymmetry, or facial profile problems) and the general dental condition: upper and lower midline position (right/center/left), presence of temporomandibular disorders, bruxism, and periodontal status. Any implants, extracted teeth, and dental crowns are marked directly on the interactive tooth chart in the portal.

> Note: Every clinical detail must be entered into the system accurately - incomplete records can delay treatment planning or lead to an inaccurate aligner design.

8.6 Clinical Photo Protocol

8.6.1 Why Photographs Matter

High-quality photographs help the orthodontist and the digital planning team assess the case visually. Together with intraoral scans and X-rays, clinical photographs are essential for a precise digital treatment plan. Poor-quality photographs or incorrect angles may delay the planning process or lead to errors in the aligner design.

8.6.2 Standard Photography Set-Up

The standard instrument set for a diagnostic/photographic appointment includes: an examination kit, impression tools and materials, a digital camera, an intraoral mirror for photographing the dental arches, and a lip retractor.

> Note: A professional digital camera (DSLR or dedicated dental camera) is the standard equipment for the clinical photo protocol and is normally available in an orthodontic practice. A smartphone camera may be used for quick or preliminary shots - as tested within the project - provided consistent image quality, lighting, and patient positioning are maintained.

Patients are photographed in three standard projections: frontal view with lips closed; frontal view with teeth exposed in centric occlusion; and profile view. If facial asymmetry is present, profile photographs are taken from both the right and left sides. Additional photographs may be requested by the orthodontist depending on the clinical situation - for example, a smiling profile photo, a profile photo during the Eschler–Bittner test (forward positioning of the mandible), or a three-quarter smiling view. To ensure photographs are comparable over time, identical positioning and distance from the camera are required at every visit.

8.6.3 The Assistant's Role During Photography

When photographing the dental arches, the assistant seats the patient in the required position for the shot, places the lip and cheek retractor, positions the intraoral mirror, and continuously checks that the mirror does not fog up.

- Lip retractor - provides good access to the oral cavity and a clear view of the dental arches.
- Intraoral mirrors - used to capture intraoral photographs of the upper and lower arches, and occlusal photographs from the right and left lateral projections.

8.6.4 Photography Technique Checklist

The dental assistant is responsible for the technical quality of the photo set. Before uploading, check every image against the points below:

- Lighting: use even, shadow-free lighting - ideally a ring flash or dedicated dental photography flash. Avoid direct overhead lamps, which cast harsh shadows and create glare on wet enamel.
- Background: extraoral photos should be taken against a plain, neutral background, with the patient's hair pulled back and any glasses or jewelry that obscure the face removed.
- Patient head position: for frontal and profile extraoral shots, position the head in natural head posture (Frankfort horizontal plane roughly parallel to the floor); take each view both at rest and with a natural smile.
- Framing and distance: keep consistent framing and camera distance across all photos in the set, and across follow-up visits, so images are comparable over time.
- Retraction and visibility: use a lip retractor and intraoral mirror to fully expose both arches; dry the teeth beforehand to avoid saliva glare and fogging on the mirror.
- Focus and exposure: confirm each photo is in sharp focus, correctly exposed (not too dark or blown out), and centered before moving to the next view.
- Completeness check: verify that all required views (Section 8.5.3) are present before uploading the set to Ordoline; an incomplete or blurred set should be retaken immediately rather than submitted as-is.

> Note: If any photo in the set is unclear, incorrectly framed, or missing, request the treating clinician to review before submission - a poor-quality photo set is a leading cause of delayed or inaccurate aligner design.

9. Glossary of Key Terms

The following terms are used consistently throughout this protocol. Translators are asked to preserve a single, consistent Lithuanian and Latvian equivalent for each term across the entire document.

9.1 General Orthodontic Terms

Term	Definition
Orthodontics	The branch of dentistry concerned with the diagnosis, prevention, and treatment of dental and jaw irregularities (malocclusion).
Malocclusion	Any deviation from the ideal (orthognathic) alignment and contact of the upper and lower teeth.
Orthognathic bite	The normal, ideal bite, providing correct chewing, speech, and swallowing function.
Occlusion	The contact relationship between the upper and lower teeth when the jaws are closed.
Orthodontist	A dental specialist who diagnoses, prevents, and treats malocclusion and irregularities of the teeth and jaws.
Dental assistant	The clinical team member who supports the orthodontist chairside, prepares the patient and materials, and performs delegated clinical and administrative tasks such as scanning, photography, and digital case submission.
TMJ (Temporomandibular Joint)	The joint connecting the lower jaw (mandible) to the skull, responsible for jaw movement.

9.2 Malocclusion Types and Related Conditions

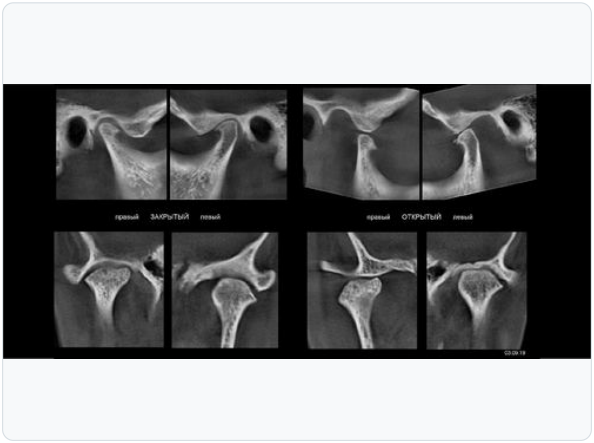
Term	Definition
Distal bite (Class II malocclusion)	A malocclusion in which the upper jaw is positioned forward relative to the lower jaw; commonly affects diction, chewing, and breathing.
Mesial bite (Class III / mesial occlusion)	A malocclusion in which the lower jaw dominates the upper jaw; causes enamel wear and changes in facial expression.
Open bite	A malocclusion in which the upper and lower front teeth do not close together, creating a gap that interferes with lip closure and chewing.

Term	Definition
Crossbite	A malocclusion in which one or more lower teeth overlap the upper jaw, or vice versa; often originates during fetal development or from childhood habits.
Deep bite	A malocclusion in which the upper front teeth almost completely cover the lower front teeth, distorting facial proportions and accelerating tooth wear.
Cleft lip and palate	A congenital anomaly in which the tissues of the lip and/or palate fail to fuse properly during early fetal development; treatment requires a multidisciplinary approach including surgery, orthodontics, and speech therapy.
Pierre Robin Sequence	A rare congenital anomaly combining micrognathia, glossoptosis (tongue displacement), and cleft palate; may cause feeding difficulties, breathing problems, and airway obstruction.
Treacher Collins Syndrome	A genetic disorder characterized by deformities of the facial bones and soft tissues, occurring in approximately 1 of every 50,000 newborns; treatment aims to restore breathing, swallowing, hearing, and facial form.
Goldenhar Syndrome	A congenital condition involving abnormal development of the first and second pharyngeal arches, affecting the ear, jaw, and facial structures, often asymmetrically.
Micrognathia	Abnormal smallness or underdevelopment of the jaw, most often the lower jaw (mandible).

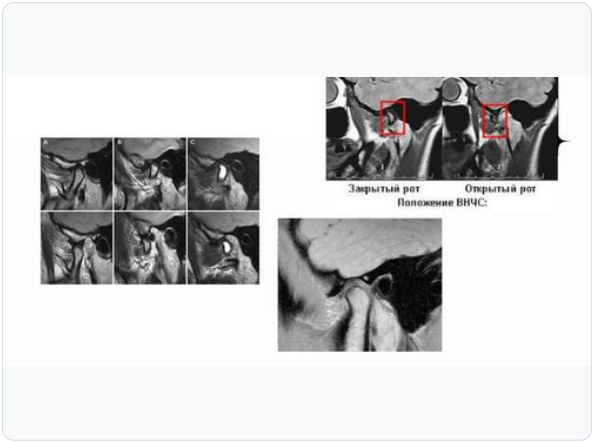
9.3 Diagnostic Methods

Term	Definition
Panoramic radiography (OPG)	A single X-ray image showing the full upper and lower jaw, teeth, and surrounding structures in one view.
Cephalometric X-ray (CEPH)	A standardized skull X-ray used for orthodontic measurement, growth analysis, and treatment planning.
3D Cephalometry	A three-dimensional cephalometric analysis, typically derived from CBCT data, used for more precise skeletal and dental measurements.
CBCT (Cone-Beam Computed Tomography)	A 3D X-ray imaging technique used for detailed evaluation of dental, jaw, and airway anatomy.
Hand and wrist radiography	An X-ray of the hand and wrist bones used to assess a patient's skeletal maturity and growth stage.
TMJ tomography	Layer-by-layer radiographic imaging of the temporomandibular joint used to evaluate its bony structures.

Term	Definition
TMJ MRI	Magnetic resonance imaging of the temporomandibular joint, used to assess the soft-tissue disc and surrounding structures.
Diagnostic models	Physical or digital 3D models of a patient's dentition obtained by impression or intraoral scanning, used for diagnosis and treatment monitoring.



TMJ Tomography



TMJ MRI

9.4 Orthodontic Appliances and Instruments

Term	Definition
Examination kit	Basic hand instruments (mirror, probe, tweezers) used during a diagnostic or check-up appointment.
Lip retractor	An instrument used to hold the lips away from the teeth during intraoral photography.

Term	Definition
Intraoral mirror	A mirror used to capture indirect intraoral photographs, including occlusal and lateral views.
Heinz Appliance	A removable plate-type appliance (with variants such as a shield, flange, or bead) used to correct habits such as thumb-sucking, mouth breathing, or tongue-thrust.
LM-Activator	A dual-arch, elastic functional appliance used to correct developing malocclusions and harmful oral habits in growing patients.
Schwarz Appliance	A removable orthodontic plate with an expansion screw, used to widen the dental arch; may include modifications such as a Bertoni screw for asymmetric expansion.
Bertoni screw	An expansion screw used in modified Schwarz appliances to allow differential (asymmetric) widening of the arch.
Delaire Mask	A protraction facemask used to advance an underdeveloped upper jaw, typically anchored to the forehead and chin.
Tubinger Face Mask / Petit Mask	Facemask-type orthopedic appliances used for maxillary protraction or mandibular growth guidance, anchored extraorally.
Chin Cup	An extraoral appliance that applies backward and/or upward force to the chin, used to restrain or redirect lower jaw growth.
Fixed appliance (braces)	A non-removable appliance consisting of brackets bonded to the teeth, an archwire, and a fixation method (ligatures or self-ligating clips).
Bracket	The small component bonded to a tooth that holds the archwire in place in a fixed appliance.
Archwire	The wire that runs through the brackets and provides the active force that moves the teeth.
Ligature	The elastic or metal tie that secures the archwire inside a conventional bracket slot.
Self-ligating bracket	A bracket with a built-in clip or door mechanism that secures the archwire without a separate ligature.
Derichsweiler Appliance	A fixed, bonded palatal expansion appliance used for rapid maxillary expansion in growing patients.
Hyrax appliance / Variety screw	A tooth-borne or bone-borne rapid palatal expansion device activated with a special key; “Variety” refers to a screw brand/type used in similar expanders.

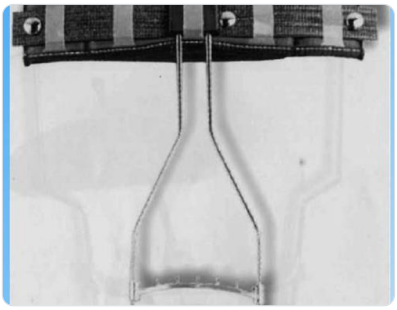
Term	Definition
McNamara Appliance	A removable/bonded functional appliance combining maxillary expansion with mandibular growth guidance.
Haas Appliance	A tooth- and tissue-borne rapid palatal expander with an acrylic component contacting the palate.
Marco-Ross Appliance	A fixed palatal expansion appliance design used for controlled arch widening.
Aligner	A custom-made, removable, transparent tray used to move teeth gradually, as an alternative to fixed braces.
Retainer / Gnathological splint	An appliance worn after active treatment, or for joint/muscle therapy, to maintain tooth position or stabilize the bite.
AquaSplint / AquaLizer	Prefabricated, fluid- or gel-filled splints used for short-term diagnostic or therapeutic stabilization of the bite and temporomandibular joint.
Bruxism splint (hard/soft)	An occlusal splint worn, typically at night, to protect the teeth from wear and reduce muscle tension caused by tooth grinding (bruxism).
Weingart pliers	General-purpose pliers used to insert, seat, and remove archwires from the bracket slots.
Bird-beak pliers	Pliers with one round and one flat tapered beak, used to form precise bends and loops in archwire.
Distal-end cutter	A cutting plier that trims excess archwire flush with the last molar tube while holding the cut fragment.
Ligature-tying pliers (Mathieu pliers)	Pliers used to twist and place steel ligature wires around bracket wings.
Band pusher / band seater	An instrument used to seat an orthodontic band fully onto the molar during fitting.
Bracket positioning gauge	A measuring instrument used to verify correct height placement of each bracket before bonding.
Power chain (elastic chain)	A connected series of elastic modules that applies continuous force to move one or several teeth.
Elastic separator	A small elastic ring placed between teeth to create space before band placement.
Orthodontic relief wax	Soft wax applied over a poking wire end, loose bracket, or irritated soft tissue for immediate patient comfort.
Three-jaw (loop-forming) pliers	A plier with two outer jaws and a central jaw, used to form precise loops, springs, and rectangular bends in archwire.

Term	Definition
Adams pliers (universal pliers)	Pliers used to bend and adjust Adams clasps and other retentive wirework on removable appliances, facebows, and headgear.
How (utility) pliers	A general-purpose orthodontic plier used for a wide range of small bending and holding tasks.
Ligature wire cutter	A cutting plier used to trim soft steel ligature wire to length.
Mini-implant / Temporary Anchorage Device (TAD)	A small titanium screw placed into the jawbone to provide fixed skeletal anchorage for complex tooth movements.
TAD driver	The instrument used to drive a mini-implant into the prepared bone site under controlled torque.
Interproximal reduction (IPR)	The controlled removal of a small amount of enamel between teeth, using strips or discs, to relieve crowding or create space, especially in aligner cases.

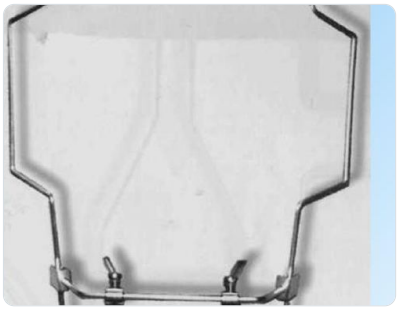
Heinz Appliance

Bertoni

Delaire Mask



Tubinger Face Mask



Petit Mask

Derichsweiler Appliance

Variety Screw

McNamara Appliance

Haas Appliance

Marco-Ross Appliance

AquaLizer

9.5 Intraoral Scanning - 3Shape TRIOS 4

Term	Definition
Intraoral scanner	A handheld digital device that captures a 3D model of the teeth, gums, and occlusion directly from the mouth.
TRIOS 4	The 3Shape intraoral scanner model used in this protocol; wireless and handheld, with real-time chairside display.
Lock surface (tool)	A scanning software tool that freezes already-captured surface data to prevent over-scanning and reduce processing errors.
Calibration (scanner)	The process of recalculating a scanner's internal geometry and camera parameters, performed regularly to maintain scanning accuracy.
Autoclave	A device that sterilizes instruments, including the scanner tip, using pressurized steam at a controlled temperature.
Class B vacuum autoclave (EN 13060)	A high-grade autoclave standard required for sterilizing hollow and packaged instruments such as the scanner tip.
Chemical (high-level) disinfection	A liquid chemical disinfection method (e.g. Wavicide-01 solution) used as an alternative to autoclaving for items that cannot tolerate heat.

9.6 Ordoline Digital Workflow

Term	Definition
Ordoline	The digital case-submission and aligner-manufacturing platform used for orthodontic treatment planning and aligner production.
Case submission	The process of uploading a patient's personal data, scans, radiographs, and photographs to Ordoline to initiate treatment planning.
Impressions delivery	The Ordoline portal field used to specify how the 3D scan/impression data will be sent (e.g. directly through 3Shape, or another supported scanner/format).
CBCT upload	The process of submitting cone-beam CT data to Ordoline, accepted only as a RAR or ZIP archive under 2 GB.
Clinical photo protocol	The standardized set of extraoral and intraoral photographs (frontal, profile, bite, and occlusal views) required for every Ordoline case.
Existing conditions / charting	The section of the Ordoline portal where the patient's complaints, dental status, and tooth-level conditions (implants, extracted teeth, crowns) are recorded.

10. Approval and Sign-Off

This protocol has been reviewed and approved by all Shape the Future partner organizations prior to translation and publication.

This document was developed collaboratively by students and coordinators across all three Shape the Future partner organizations (see Section 1.4), and has been reviewed and approved by each partner organization.

Role	Name / Organization	Signature	Date
Prepared by	Shape the Future project students and coordinators		
Approved by	Stomatoloogia Pluss Training Center (Estonia)		
Approved by	The Red Cross Medical College of Rīga Stradiņš University (Latvia)		
Approved by	Utenos kolegija (Lithuania)		
Approved by	Shape the Future Project Coordinator		

> Note: This document has been reviewed and approved by all Shape the Future partner organizations (Version 1.1).

11. Appendix - Sources

11.1 Shape the Future Project Materials

- "Introduction to Orthodontics: Fundamentals, Purpose, and Types of Malocclusion - Empowering Dental Assistants through Digital Innovation in Orthodontics" (project presentation).
- "3Shape Protocol" - 3Shape TRIOS user manual excerpt (cleaning, sterilization, calibration, troubleshooting), shared by Stomatoloogia Pluss Training Center (Estonia), a Shape the Future partner.
- "Ordoline Presentation" - Ordoline system overview and dental-assistant workflow.

11.2 External References

- 3Shape Support - "Correct full TRIOS scan scanning strategy": support.3shape.com
- 3Shape Blog - "Insider tips on how to perfect your TRIOS scan technique": 3shape.com/en-us/blog/how-to-use-trios
- Avinent - "5 Steps for Perfect Scanning with TRIOS by 3Shape": avinent.com

This appendix should be reviewed and updated with full citations before the document is finalized for external distribution.