

The key to amazing efficiency.

Ivotion™

Clinical guide



Ivotion Denture System

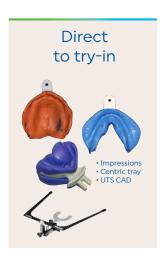
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Clinical Workflows





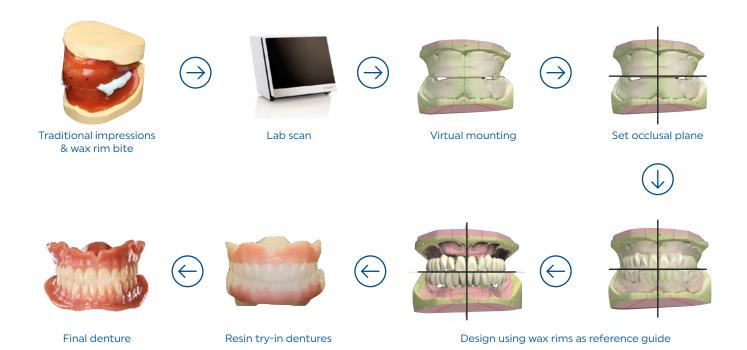




- The first three workflows require virtually no changes in clinical materials or technique and will only be briefly outlined along with a suggested evaluation form.
- The "Direct to try-in workflow" will be described in more detail since it does introduce several new concepts.
- Please note that the try-in appointment information is common to all workflows (except immediate dentures) and will be addressed separately.

"Wax rim bite" workflow

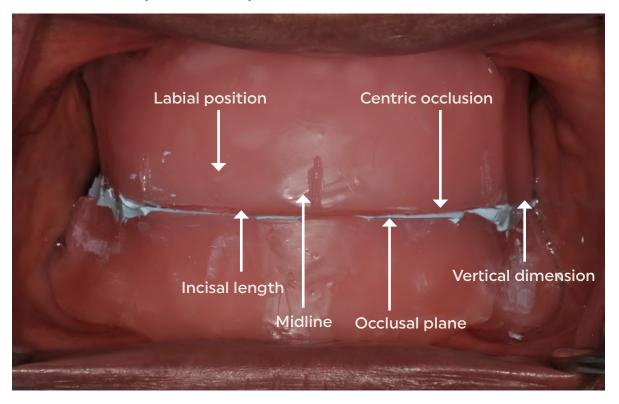
Traditional impressions & wax rim bite



- To convert to the digital design process, the "wax rim bite" is scanned along with individual scans for the "mandibular and maxillary casts".
- The wax rim bite will serve as a reference matrix to help guide the positioning of the "set-up template," which is positioned by using information provided by the wax rims. Therefore, it is important to adjust the wax rims as accurately as possible.
- The teeth can be virtually repositioned either individually or segmentally as desired; however, as mentioned, the wax rim matrix can be "ghosted in" at any time to function as a frame of reference.
- The process of designing the denture is the same for "resin try-in dentures" and "final dentures". The only difference is the choice of materials depending on the desired outcome.

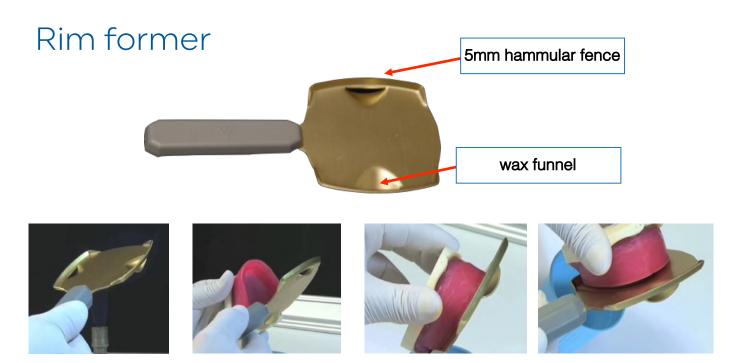
"Wax rim bite" workflow

Wax rim prescription

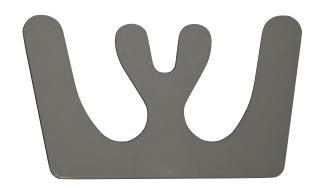


- The intent of the conventional "wax rim bite" is to serve as a vehicle to record patient data and provide the technician a guide for setting teeth. It will also serve the same purpose for the digital technician when designing the placement of teeth digitally. Therefore, the clinician should carefully form the wax rims to communicate midline, incisal lengths and occlusal plane.
- The Centric Occlusal (CO) record and the Vertical Dimension of Occlusion (VDO) will respectfully determine the virtual mounting.

Tips



Biteplane



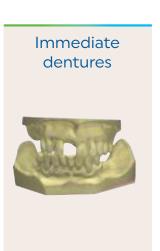


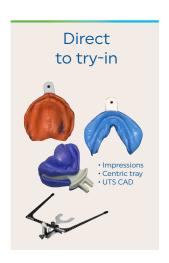
Clinical Workflows





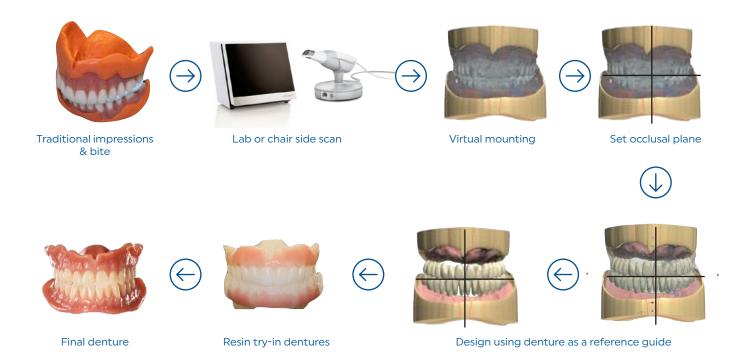






"Impressions & bite in dentures" workflow

Traditional impressions & bite

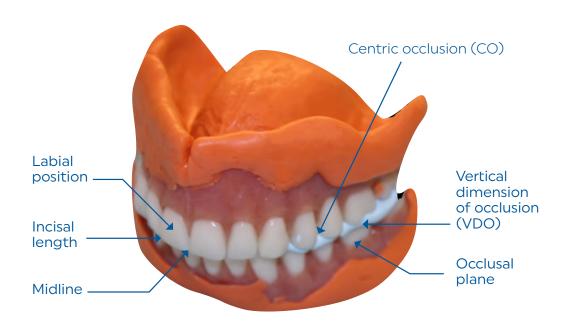


- The "Impressions & bite in denture workflow" uses the patient's old dentures (or duplicates) as impressions trays and bite.
- The impressions and bite are scanned using lab scanner or they can be scanned chairside with intra-oral scanner (IOS).
- The dentures act as a reference matrix for setting the occlusal plane template.
- The dentures are "ghosted in" at any time during the design process and act as a reference matrix for designing the new denture. Therefore, a complete evaluation of the patient's existing dentures prior to scanning is important.
- Depending on the desire of the clinician either a resin try-in denture or final <u>denture</u> can be fabricated.

"Impressions & bite in dentures" workflow

Existing denture evaluation

Midline				
no change	marked on denture	refer to comments		
Maxillary incisal length				
no change	increasemm	decreasemm		
Mandibular	incisal length			
no change	increasemm	decreasemm		
Lip support				
no change	increasemm	decreasemm		
Bipupillary plane				
acceptable	comments:			
Camper's plane				
acceptable	comments:			
Bite (CO/VDO)				
accept as per record comments:				



Tips

Closed mouth functional impressions











Patient is guided to centric occlusion during each step of the border molding process and the final wash impression in order to maintain an occlusal relationship. This also allows the patient to more physiologically perform border movements.

Add wax to thicken thin areas of the impression borders to facilitate the scanning procedure.





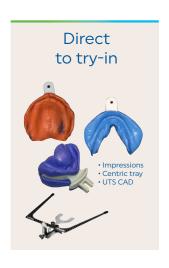
Clinical Workflows









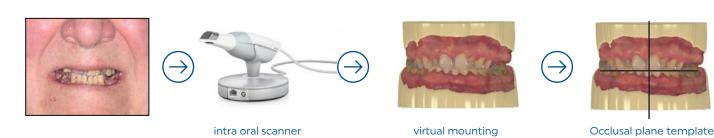


"Immediate denture" workflow



- There are many benefits to using digital technology for <u>immediate dentures</u>. In particular, the extracted teeth scan can be recalled into view and serve as a guide for tooth positioning. Therefore, the new teeth can be positioned similar to the natural teeth positions which significantly aids the patient during this very difficult transition phase from natural teeth to artificial teeth.
- As mentioned, the extracted teeth can be "ghosted in" during the design process to help guide tooth placement based on the pre-extraction evaluation of the extracted teeth. Therefore, it is important to evaluate the teeth prior to extraction.
- A clear surgical guide with or without teeth can also be provided if desired.

Note: The intra oral scanner may be used instead of traditional impressions. Other than scanning, the denture design process is the same.



"Immediate denture" workflow

Pre-extraction clinical evaluation

Midline				
no change	marked on denture	refer to comments		
Maxillary in	icisal length			
no change	increasemm	decreasemm		
Mandibular	incisal length			
no change	increasemm	decreasemm		
Lip support				
no change	increasemm	decreasemm		
Bipupillary	plane			
acceptable	comments:			
Camper's plane				
acceptable	comments:			
Bite				
acceptable	comments:			



Tips Impressions



Virtual XD Putty impression material is an excellent material to take an immediate impression due to its extra body which enables it to extend into the vestibular areas. The putty impression can be trimmed and washed with a light body material to increase the accuracy if desired.

Tips

Impressions



If teeth are severely undercut or loose, an alginate material is recommended. The AccuDent XD is an excellent choice since it is provided as a two phase material. The injection (light body) is injected around the teeth and the tray material (heavy body) provides the viscosity necessary to reach and record the vestibular areas.

Clinical Workflows









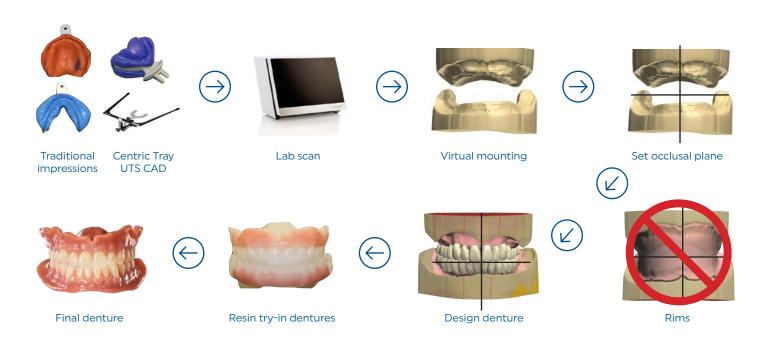
Unlike the other workflows described, the "Direct to try-in workflow" basically starts from "scratch" and does require learning some new techniques

In addition, this workflow is unique from the other three workflows since there is no reference matrix (wax rim, existing denture, extracted teeth) to provide a guide for the placement of teeth for the new denture.

Also, an inter-ach relationship (bite) must be taken in order to virtually mount the scanned impressions in the design software.

The Centric Tray and UTS CAD are unique to this workflow and facilitate recording the inter-arch relationship.

"Direct to try-in" workflow



 \bigcirc

Dentures are designed using information provided by the Denture Gauge and/or Papillmeter. If no information is provided, then average values will initially determine tooth position.

- The Centric Tray and UTS CAD tools are unique to the "Direct to try-in workflow".
- The Centric Tray record and impressions are scanned and virtualy mounted.
- The software will assign an occlusal plane template using the UTS CAD information. This template will act as a guide and reference for setting the new denture teeth.
- Note that the rim stage is eliminated and the output will go directly to fabricating a try-in denture. Thus the name of the workflow "Direct to try-in".

Impressions

Impression options



- There is a multitude of impression materials and technique options to choose from.
- The author has selected the above options for discussion, however, the clinician could certainly use their familiar traditional materials and techniques if desired.
- It should be noted that the alginate option would require the impressions to be either scanned immediately or poured and prepared as casts which could then be scanned.

Impressions

AccuDent® XD alginate impression system



AccuDent XD

AccuDent XD is a two phase alginate system consisting of a light body syringe material and a heavy body tray material.



Syringe material

The syringe material is mixed first and loaded into the syringe provided with the kit. It has a 30 second longer working time which compensates for the mixing and loading time.





Tray material

The Tray material is more viscous. It is suggested that a small amount is first loaded in the tray and pressed to engage the retentive holes in the tray.

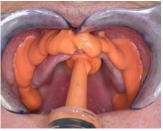




Syringe material injection

The syringe material is injected into the vestibule and some into the anterior palate area.





Seating tray

The tray is inserted and seated until the syringe material begins to express over the borders. It is suggested to not overseat the impression.





Tray removal

After the material has set, carefully remove the tray by breaking the peripheral seal first and then rotating the tray from the mouth.





Completed impressions

Impressions are inspected for proper extension and accuracy.





Impressions

Virtual® XD PVS impression putty material



Thermoplastic trays

The AccuDent® XD system has a complete assortment of dentate and edentulous impressions trays. A major feature of the trays is the thermoplastic property which allows the tray to be modified by soaking in hot water.





Thermoplastic trays

An example of tray modification is shown for the mandibular edentulous tray in the master notch areas.





Thermoplastic trays

An example of tray modification is shown for the maxillary edentulous tray in the retrozygomatic areas.





Virtual XD putty

Virtual XD impression putty is an excellent material to make preliminary impressions for the edentulous mouth. Its viscosity helps to extend the material into the vestibular borders. Typically two scoops of each material is sufficient for most impressions.

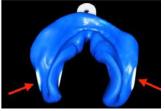




Virtual XD putty

This mandibular impression demonstrates the need to modify the mandibular impression tray in the master notch area which was previously mentioned.

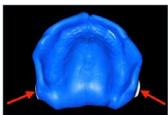




Virtual XD putty

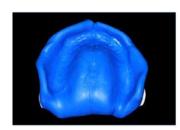
This maxillary impression demonstrates the need to modify the impression tray in the retrozygomatic area as previously mentioned





Virtual XD putty

Impressions are inspected for peripheral extensions and accuracy.





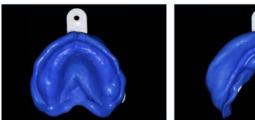
Impressions

Virtual® XD PVS impression putty + light body wash



One of the major advantages of the putty system is that if an area is deficient (as noted for the palatal area) the impression can be corrected with a wash impression without having to remove the material and start over.

Also the added tissue detail will provide more accuracy when the impressions are scanned.



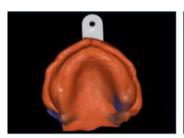


Excess material and border thicknesses are removed and all frenum attachments are also relieved.





The Virtual XD light body material fast set is selected for the wash impression. The impressions are inspected for extension and accuracy.





Centric Tray / UTS CAD records



The Centric Tray and UTS CAD are unique to the "Direct to try-in workflow".

The purpose of the Centric Tray record is to provide an inter-arch relationship at a select vertical dimension. The purpose of the UTS CAD is to provide facial plane information (Bipupillary & Camper's) to the design software, which that will help select the occlusal plane template.

Centric Tray

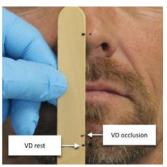
Virtual XD PVS impression putty material



Predetermination of VDO

Reference marks placed on nose and chin. Patient is asked to relax to approximate "VD rest" position. A tongue blade is used to mark the reference marks. Another mark is made approximately 4mm closed to identify the VD of occlusion.

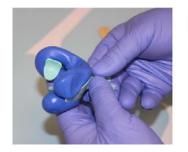


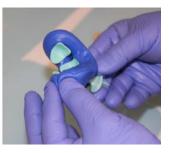


Mix and load Centric Tray

Two scoops of each putty material is sufficient for most patients; however, if a patient has severe resorption, three scoops may be required.

Thoroughly mix material and evenly load upper and lower chambers of the Centric Tray.





Guide patient to close

Once the tray is inserted have the patient relax and chin guide the patient closure.





Close to previously determined VDO Continue having the patient close until the predetermined VDO is obtained.





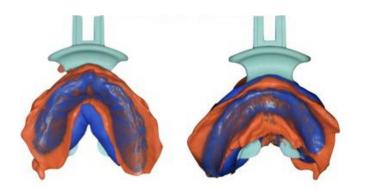
Centric Tray record Inspect for adequate extension and accuracy.





Light body wash

If the record is insufficiently extended or has large voids a light body wash impression can be added. This is particularly useful if the patient has a severely resorbed arch that is left with little anatomical detail to record.



UTS CAD values



Centric Tray handle

The UTS CAD holder accepts the Centric Tray handle. It also accepts the Bitefork, which can be utilized for other procedures.

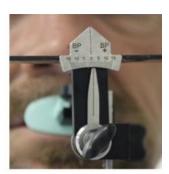




Bipupilary plane (BP) This is very important to accurately assess.

The value is recorded as BP.





Camper's plane (CE)

Camper's plane is referred to as CE (Camper's Even) and not CP because it is a more universal interpretation. This plane is not as critical to record since it will most often be changed due to other factors such as interact distance, retromolar pad anatomy, etc. however, it does provide a starting position.







Phonares® II

The ultimate tooth solution

Precision crafted with Nano Hybrid Composite, Phonares II represents the next generation of denture teeth offering a unique blend of unrivaled beauty and unparalleled performance.



Blueline® DCL

The high performance tooth choice

BlueLine denture teeth easily blend next to natural teeth in partial denture cases, or give the complete denture wearer a beautifully natural and esthetic appearance.



Vivodent® S PE | S DCL

Two tooth lines — One esthetic result

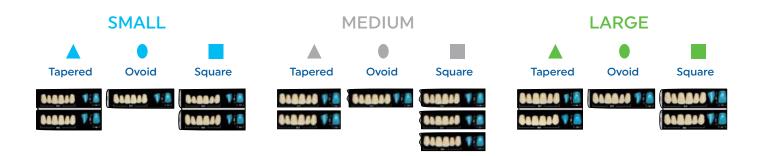
Esthetically and prosthetically optimized, designed to suit the characteristics of each individual tooth. Constructed entirely of the highly cross-linked DCL polymer (Double Cross-linked) material



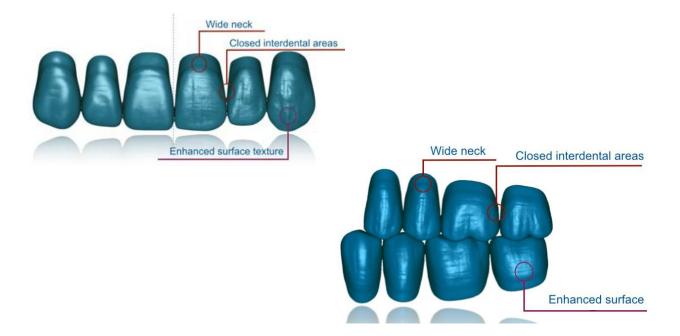
Full arch preset

Most moulds in each mould system are **preset** as a complete coordinated anterior and posterior set-up. The selection of the maxillary tooth mould will automatically select the appropriate mandibular anterior and posterior teeth. The posterior teeth can also be selected as lingualized or semi-anatomic Orthotyp (20 degrees) occlusal schemes.

SR Vivodent® S DCL



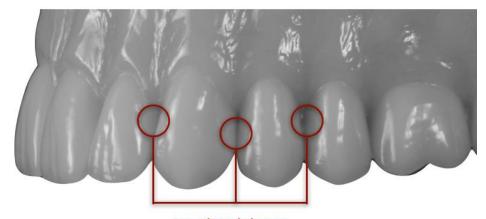
The maxillary anterior mould is the focus for tooth selection since the mandibular anterior teeth and posterior teeth are automatically selected to harmonize with the maxillary anterior mould. The Vivodent S DCL is composed of 16 maxillary anterior moulds, which are select moulds that have been enhanced cervically to provide an excellent architecture for milled gingiva papillae. They are uniquely organized to size (small, medium, large) and shapes (tapered, ovoid, square) to facilitate tooth selection.



Phonares® II



The organization of the Phonares II is also unique and is arranged according to size (small, medium, large), shape (soft, bold) and age (youthful, universal, mature). Similar to the Vivodent S DCL, the cervical enhancement provides an excellent milled gingiva architecture.



Interdental closure

Visualizing complete pre-set arches is a completely different experience than viewing teeth on a mounted card. Also, having the ability to change moulds with one click affords the opportunity to view many moulds quickly and provides more visual information to help select an appropriate tooth mould. In addition, milled teeth also provide the opportunity to change individual tooth shapes with morphing tools, so the possibilities are endless.



It is suggested that the clinician make themselves familiar with tooth moulds from Vivodent S DCL and Phonares II, since they both complement the digital process.

Manufacturing processes

Oversize Process

The denture base and denture teeth are separately milled but not final milled. This allows the teeth to be bonded to the base and returned to the mill for final milling. The final mill precisely removes excess bonding material and finishes the milling process.

Materials

- Ivotion Base
- Ivotion Dent
- Ivotion Dent Multi
- · Ivotion Bond kit



Partially milled base & teeth

Bonding

Final mill

PRESCRIPTION:

Tooth moulds*: Phonares®II Vivodent DCL (Blueline®) Vivodent®S DCL

Maxillary anterior tooth mould:

Tooth shade: BL3 A1 A2 A3 A3.5 B1 B3 C2 D2

Gingival shade: Pink | Pink V | Preference | 34V | US-D

Occlusion: Semi-anatomic (20°) Lingualized

Monolithic Process

The Ivotion disc contains both the tooth and base in one disc. It uniquely fabricates the denture monolithically without a bonding interface.

Materials

Ivotion disc



PRESCRIPTION:

Tooth moulds: Ivotion Phonares®II

Maxillary anterior tooth mould:

Tooth shade: BL3 A1 A2 A3 A3.5 B1

Gingival shade: Pink V Preference US-D

Occlusion: Semi-anatomic (20°) Lingualized

Communication tools



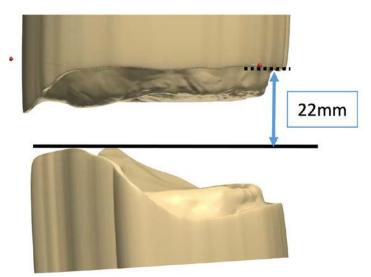






workflows provide a reference matrix (wax rims, denture, extracted teeth) to help guide the position of the new teeth. They are by far the best means of communication since they provide a tangible reference from which to create the new design. However, when starting from scratch as in the "Direct to try-in workflow," there are no reference matrices. Therefore, the following optional communication tools are suggested as they provide some guidance either based on the patient's existing dentures (Denture Gauge) or the patient's lip length (Papillameter). Without either of these, the design technician would only have average values to set the initial set-up template.

Average value



Communication tools







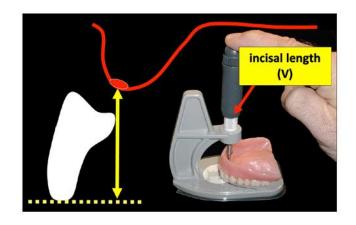
Papillameter

If the patient presents with dentures, it is an excellent opportunity to gather patient data that may help with the new denture design. The Denture Gauge is a convenient tool that helps to gather the patient's denture information. If patient does not have dentures, the Papillameter record is recommended.

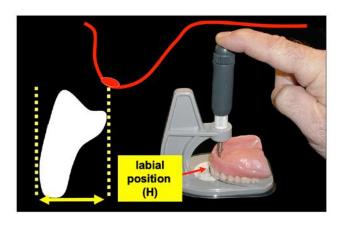
Denture Gauge

The Denture Gauge is a simple tool that provides essential information about the patient's current denture.

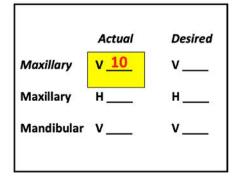
Depress plunger to engage center of the incisal papilla. The vertical gauge on the handle measures the incisal length in relationship to the center of the incisal papilla (V).

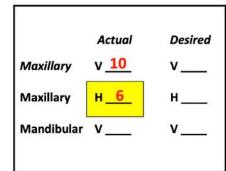


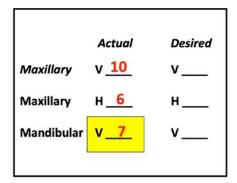
The gauge on the horizontal platform records the distance from the labial position of the incisors in relationship to the incisal papilla (H)



Denture Gauge





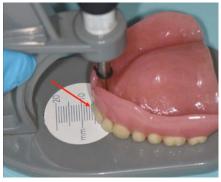




Vertical (V) = 10mm

Depress plunger to engage center of incisal papilla and record the **Vertical (V)** measurement.

This records the maxillary central incisal length in relationship to the center of the incisal papilla.



Horizontal (H) = 6mm

Record the Horizontal (H) measurement from the gauge on the base.

This records the maxillary central incisal labial position in relationship to the center of the incisal papilla.

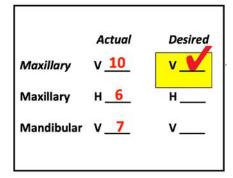


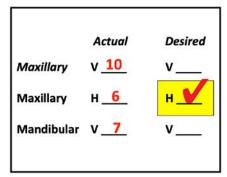
Vertical (V) = 7mm

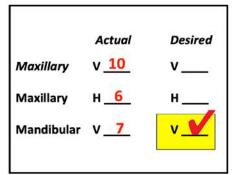
Position the plunger tip to the center of the <u>mandibular</u> ridge crest and record the **Vertical (V)** measurement.

This records the length of the mandibular incisors in relationship to the center of the ridge.

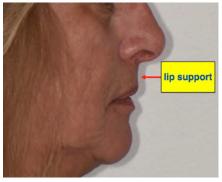
Denture Gauge











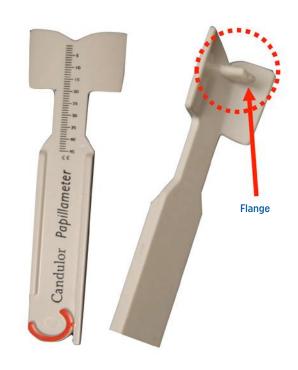


Evaluate maxillary incisal length and record whether to keep the same or either increase/decrease length using the Denture Gauge measurements as the reference.

NOTE: This value is referred to as "Teeth visible length" when setting the occlusal plane in the Model analysis design page. Evaluate maxillary lip support and record whether to keep the same or either increase/decrease labial position using the Denture Gauge values as the reference. Evaluate mandibular incisal length and record whether to keep the same or either increase/decrease length using the Denture Gauge values as the reference.

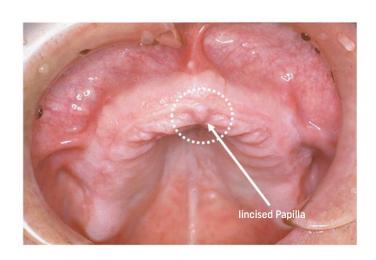
Papillameter

The Papillameter has a measurement scale on the labial surface and flange on the palatal side.



Gently rest the flange of the Papillameter on the incisal papilla.

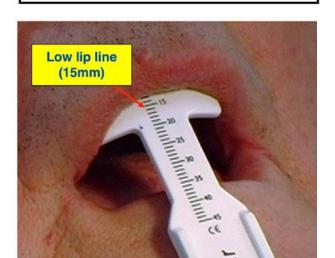
Note: the Papillameter is particularly useful when the patient does not present with existing dentures.



Papillameter

Low lip line ____15

High lip line _____

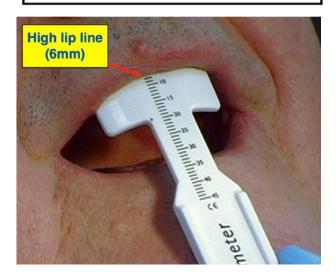


With the patient at rest, place the Papillameter on the incisal papilla and record the "low lip line" on the labial scale approximately 2mm below the upper lip.

NOTE: This value is referred to as "Teeth visible length" when setting the occlusal plane in the Model analysis design page.

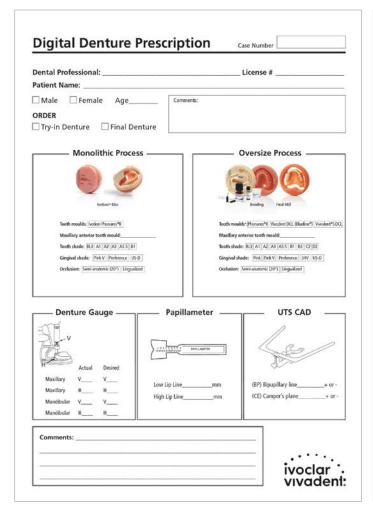
Low lip line _____

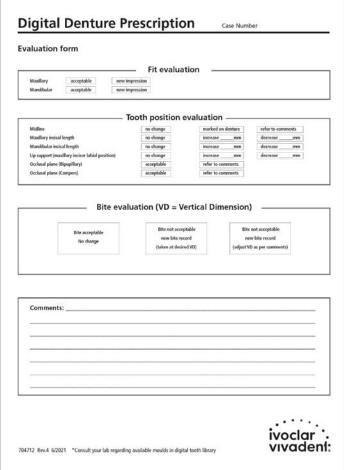
High lip line __6

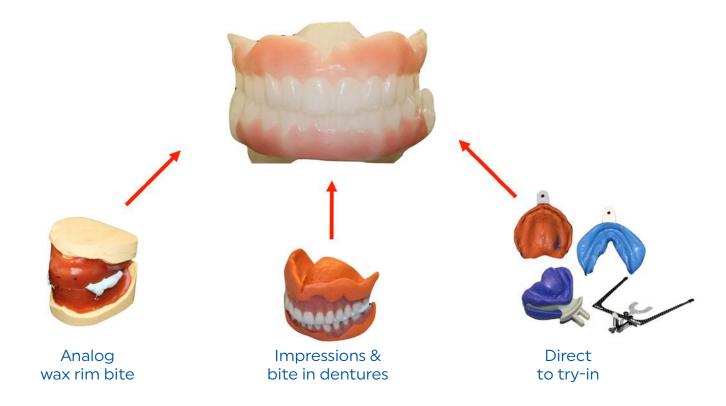


The "high lip line" is measured while the patient is smiling. Central incisor length can be estimated by subtracting the "high lip line value" from the "low lip line value". i.e the subtracted difference (15-6 = 9) suggests that the central incisor length should be a minimum of 9mm to avoid a gummy smile.

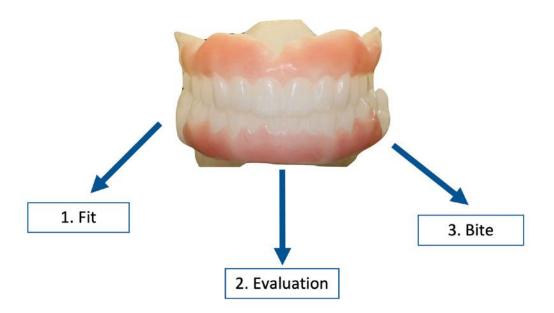
Ivotion Digital Denture Prescription







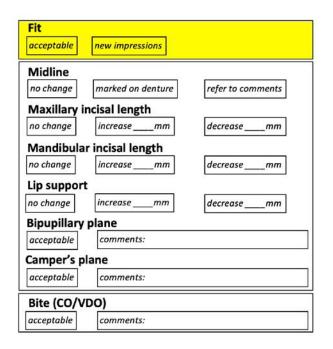
The "clinical resin try-in" is an option for all three workflows described. Clinical evaluation of the resin try-in dentures is similar to the traditional wax try-in evaluation, except of course the teeth are fixed and they do not represent the shade of the actual denture teeth. However, as shown later, resin try-in dentures can be marked, ground, etc. to facilitate the ability to communicate the desired changes. The resin try-in dentures can be milled or printed.



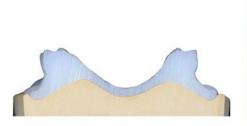
Suggested sequence for the clinical try-in evaluation:

- **1 Fit:** Since the accuracy of the try-in dentures is extremely accurate, it is possible to make an evaluation of fit with confidence. If not acceptable, new impressions must be taken using the trial dentures as impression trays. Note: if one arch is impressioned, it is advised that both be impressioned since the dentures will have to be rescanned and redesigned to a new order form.
- **2 Evaluation:** The <u>evaluation form</u> serves to remind the clinician of necessary observations and documentations. Note: If impressions must be made, it is suggested that the evaluation be completed after impressions are made since the impression material may slightly alter the dentures.
- **3 Bite:** If a new bite registration is necessary, take it after the dentures are evaluated. Note: if a new bite is taken without impressions then the original design and order form can still function. As mentioned, if new impressions are made, then a new bite is mandatory and the case must be rescanned and redesigned using a new order form.

Try-in evaluation form









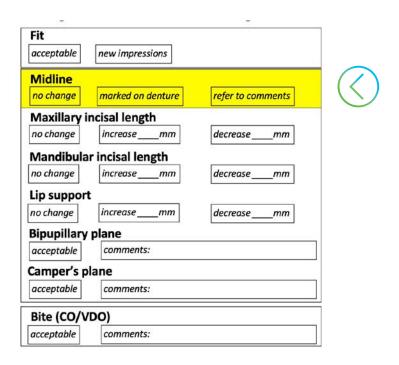


Fit: Since the dimensions of the digital try-in dentures are extremely accurate, it is possible to make an evaluation of fit with confidence. If fit is not acceptable, new impressions must be taken using the trial dentures as impression trays. Note: patient should be in occlusion when applying impression materials.





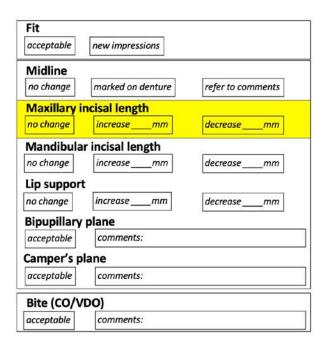
Try-in evaluation form





If the midline requires correction it can be marked on the resin try-in denture, which will be picked up in the scan. Or it can be prescribed in the comments; i.e. move midline 2mm to patient's left.

Try-in evaluation form

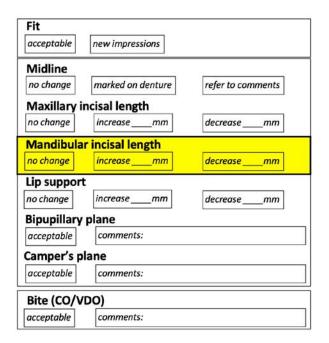




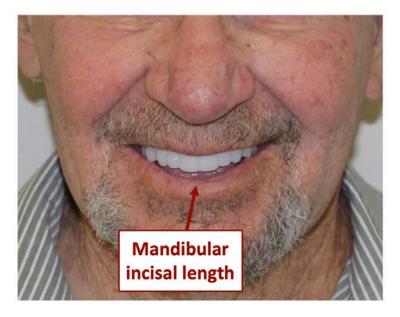


Changes can be either be documented in the evaluation form, or be marked or ground (shown later), or material added to communicate the desired length.

Try-in evaluation form

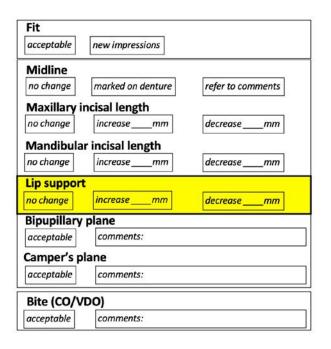






The mandibular length can be challenging to communicate because it is interrelated to VDO. In other words, if the maxillary length was ok but the mandibular length was suggested to be 3mm higher, then the way to achieve this would be to increase the VDO until the lower teeth were able to be lengthened 3mm.

Try-in evaluation form

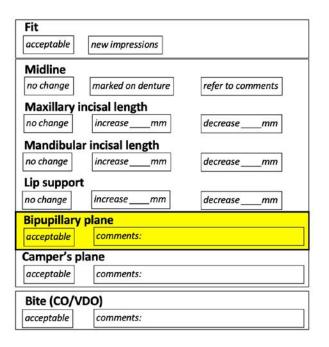




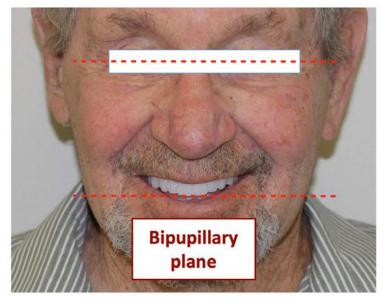


Since the resin try-in dentures are contoured exactly like the final denture, it is possible to accurately assess the patient's lip fullness (labial position of maxillary incisors).

Try-in evaluation form

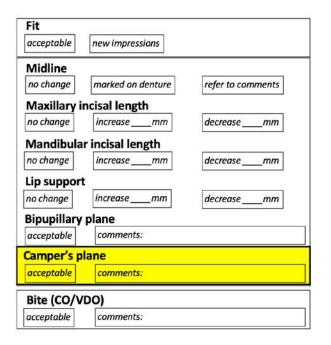




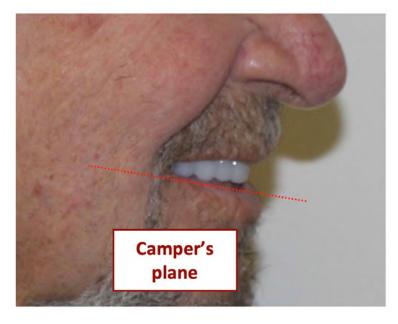


If not acceptable, explain in the comments. Note: if possible evaluate with a Biteplane (Fox plane)

Try-in evaluation form

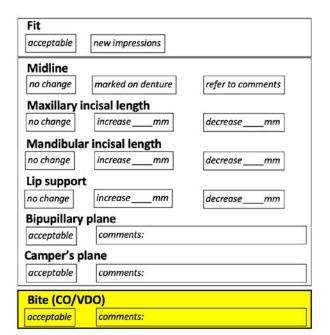




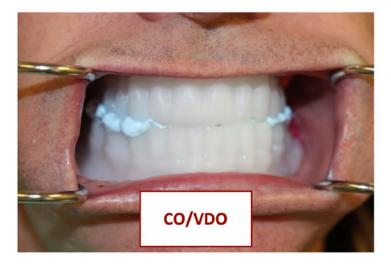


In the profile view determine if the maxillary posterior teeth appear acceptable or if they appear too low or too high.

Try-in evaluation form







If a new bite registration is necessary, it is suggested that the lower posterior teeth be ground to make room for the bite registration materials. Note: if possible, always try to record the Centric Occlusion (CO) at the desired vertical dimension (VDO).

New bite registration





Reducing the mandibular posterior teeth prior to taking the new jaw record will allow the <u>VDO to be reduced</u> if desired. It will also prevent occlusal contact interferences which may shift the jaw position.

NOTE: the final record should be at the desired VDO.

If an <u>increase of VDO</u> is desired, it is suggested that the bite registration material capture this desired relationship.

NOTE: the final record should be at the desired VDO.



New impressions





During the procedure of taking new impressions, have patient close into occlusion each time border impression material or wash impression material is added. This will keep the occlusal relationship and also allow the patient to physiologically border mould. This technique is referred to as the "Closed mouth functional impression technique".



The choice of materials and technique for impression making is determined by the clinician.

Esthetic corrections





Mark dentures

Adjust dentures

The resin try-in dentures can be marked or ground to help communicate the desired changes.

Take home try-in

One of the many advantages of the resin try-in is that the patient can safely take the try-in dentures home for the opportunity to view in their familiar surroundings. The feedback can be dramatically more informative than simply asking a patient to make decisions using a hand mirror.



Insertion / post-insertion appointments



Insertion

The accuracy of design (CAD) and manufacturing (CAM) provided by digital technology is appreciated at the insertion appointment. The time of adjustment of the denture bases and occlusion is typically significantly minimized and patient satisfaction is maximized.

Post-insertion

In addition, the number and intensity of post-insertion appointments is significantly reduced.