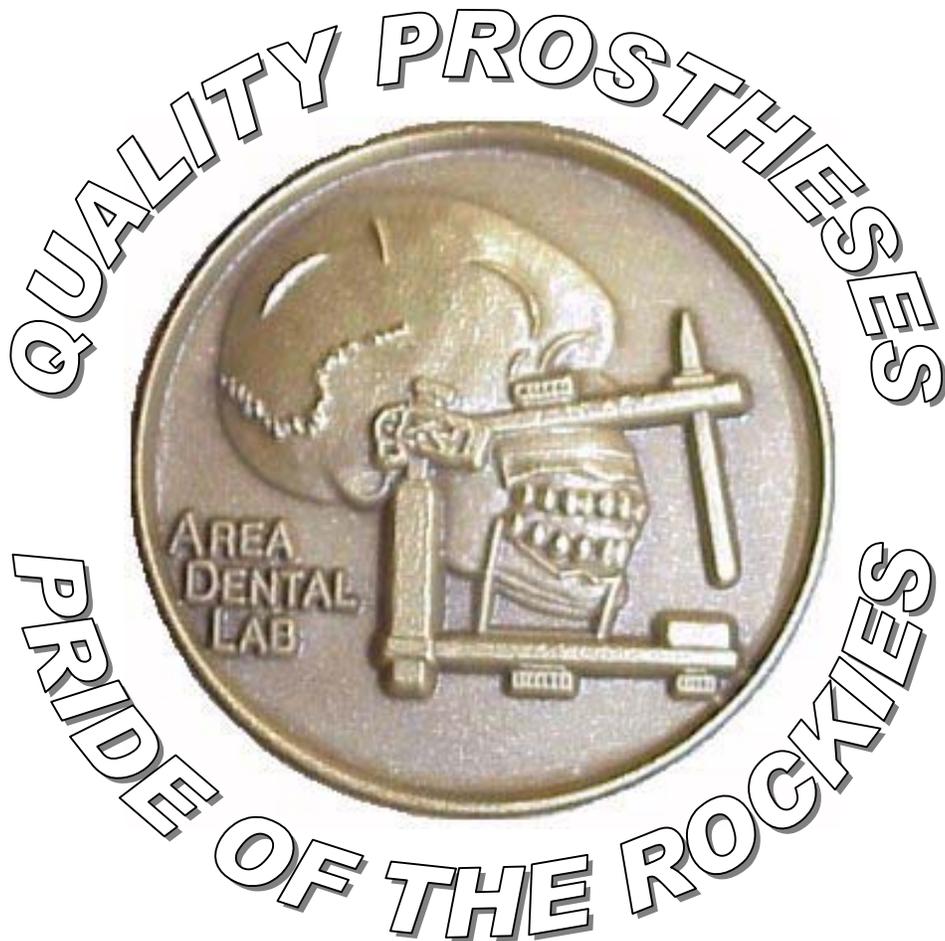


# Peterson Area Dental Laboratory



## Submission Standards

August 2002

**Peterson Area Dental Laboratory  
Submission Standards  
June 2002**

**10 DS, OL-A/SGDA  
1045 East Stewart Ave, Bldg 2012  
Peterson AFB, CO 80914-9045  
COMM (719) 556-1600  
FAX (719) 556-1605  
DSN 834-1600  
<http://www.peterson.af.mil/adl/>**

**1) Cast Preparation:**

- a) Casts must be accurate full-arch impressions (unless using a dual arch impression technique, see 2 below), have a dense hard surface, and be free of voids and nodules. A two-stage pour technique is recommended. **Note: Please clean up your casts prior to submission. Gross occlusal inaccuracies result in increased chairside time to adjust the occlusion. Spend a little time up front and save yourself a lot more time at insertion.**
  - i) Working casts utilizing the pindex method are preferred. **See Attachment 1** for a detail of the technique. Use Super-Sep® **and not** Alcote® or Vaseline® as a separator. Accurately place pins and trim dies so that they can be removed independently. Use cyanoacrylate glue sparingly to cement the pins in the cast, or clean the glue prior to placing the sleeves and pouring the base. Please ensure that the dies seat completely.
  - ii) We recommend you submit a solid cast. The restoration's proximal contacts can more accurately be adjusted on a solid cast. Clean the cast of nodules, and trim the margins free of interferences. If you would like to have the restoration seated on a solid cast, please submit the solid cast to us. Variations in dental stone, questions about dimensional accuracy of your impression material, and concerns about margin locations make it difficult for us to routinely pour solid casts for you.
- b) Pre-weighing the stone powder and storing in sealed plastic containers is strongly recommended to prevent atmospheric moisture contamination and to reduce waste.
- c) Alginate impression material will give much better results if vacuum-mixed with distilled water in the correct water/power ratio: Pre-weighing and storing of alginate material is also recommended.
- d) Opposing casts for all restorations should be hard, dense, and clear of nodules and distortions. A die stone such as Die Keen holds up well against the rigors of articulation and prosthesis fabrication.

**2) Special Note on the dual arch impression technique (Triple Tray Technique):**

- a) There are very real limits to this technique!
  - i) Please use for single unit restorations only, not well suited for fixed partial dentures, and magnifies the inherent inaccuracy of the technique. Please do not submit anterior fixed partial denture cases using this technique.
  - ii) The impression should capture as many teeth as possible, preferably the entire half of the arch.
  - iii) Patient must close completely into maximum intercuspation during impression making. There is no opportunity to correct this after the impression is poured.

**3) Cast Relationships:**

- a) Arbitrary Articulation: If the casts can be unmistakably related by means of positive tooth stops in all quadrants, no interocclusal record is required. In this instance, vertical lines which pass unbroken from the maxillary to the mandibular tooth surfaces must be drawn on three widely separated parts of the casts. Please key the base of the cast to speed your case through the lab. The ADL will then arbitrarily mount the case on a rigid hinged articulator.
- b) Interocclusal Records: If the casts cannot be hand related, a jaw relation record utilizing an accurate non-pressure recording medium must be made. Due to extremes in time and temperature during shipment, a stable polyvinylsiloxane recording medium such as Blu-Mousse® (Parkell) or Regisil® (Dentsply) should be used. Please do not send records or other materials that may distort in transit.

The record should be trimmed such that only cusp-tip indentations remain. In most distal extension situations, a stable base plate that fits the master cast is used as a record base. Mush bites and sandwich or wafer bites are not acceptable. Such records are frequently inaccurate and are easily distorted during shipment. Care must be taken in distal extension situations to ensure that the denture base is not depressed during the registration. This depression results in an increase in the interocclusal vertical dimension when the record is transferred to the casts and causes any prosthesis fabricated at that relationship to be high in occlusion. After the jaw relationship is recorded, the casts should be related using the record and compared visually with the patient's occlusion. The occluded casts must duplicate this relationship exactly. Jaw relation records must not be luted to the cast, nor should casts be luted to one another. Please submit an interocclusal record with all distal extension cases. The interocclusal record should include just the teeth prepared and the opposing teeth. Do not make a full arch interocclusal record as these are inaccurate.

- c) Whip-Mix Articulator Model 2240. Typically, casts mounted in one articulator will not relate accurately when mounted in another articulator. The Whip-Mix Model 2240 was designed to transfer a case accurately from one articulator to another of the same model. This technique allows you to mount the case on a Whip-Mix Model 2240 at your base and send only the mounted casts to the ADL. Your mounted casts will then be transferred to a Whip-Mix Model 2240 here at the ADL. The advantages of mounting the case at your base on the Whip-Mix Model 2240 includes the following: allows you to verify the mounting before sending to the ADL; eliminates the possibility of the ADL introducing mounting error; and reduces articulator shipping costs. Recent articles in the literature show that over the years of use they remain fairly accurate. We recommend that you submit casts mounted on a Whip-Mix Model 2240 for single units, and three to six unit fixed partial dentures. To ensure accuracy of mountings, we will look for verification with shimstock or an interocclusal record that you supply. For large cases or reconstructions, we recommend that you mount the case and verify the mounting on your own articulator, and send the articulator with the case. We also recommend the time-tested methods of a stable interocclusal record (see 3-b above) or lateral stone straps (see 3-d next).

- d) Lateral Stone Straps. One of the most reliable and stable means of communicating the cast relationship to the ADL is by using lateral stone straps. The casts are mounted in the usual manner in the base dental laboratory. Two large half-round dimples are side by side on both sides of the cast base with a large round acrylic bur. Blockout is accomplished with utility wax, or other suitable substance. The cast is painted with a stone separator and dental stone is gently vibrated into the dimples and build up to connect both casts. Plaster is not recommended for strap fabrication because of its low strength. When set, the straps are trimmed on a cast trimmer and labeled with the patient's name with left and right sides marked (See Figure 1). These stone matrices will record the jaw relation which was used to mount the casts and have the advantage of not breaking or distorting easily during shipment. Lateral stone straps can be made between casts that have been diagnostically mounted in an articulator, or between casts that have only been related together with a jaw relation record. Once the straps have been fabricated, send: (1) the maxillary cast with its mounting ring attached (if previously mounted via a facebow), (2) the mandibular cast and (3) the paired stone straps. The mandibular cast should be unmounted. Be sure to include the articulator type and condylar control settings. Do not send the articulator itself to the ADL unless you have no other method to meet requirements.

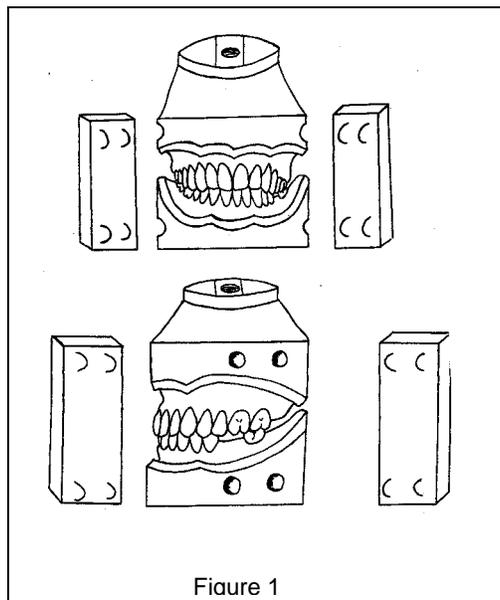


Figure 1

4) Esthetic Guides:

- a) Please submit desired esthetic design for porcelain restorations. **See Attachment 2.** Adequate esthetic guidance must be submitted, along with the case, to provide the dental laboratory technician with sufficient information to fabricate the prosthesis. Depending upon the complexity of the case, adequate guidance might be preoperative casts, wax-ups, old appliances, color slides, photographs, digital photos, or concise written instructions. Providing esthetic guidance is a professional

responsibility of the originating doctor and should never be delegated to the laboratory technicians. We recommend a “Go-by” cast. If the cast isn’t exactly how you would like it, please add wax or carve the cast to the desired esthetic shape.

**5) Fixed Restorations:**

a) Tooth Preparation for All-Gold and Metal Ceramic Restorations: Tooth preparations should be smoothed and rounded to eliminate sharp edges and line angles. Margins should be sharp, well defined and appropriately designed for the desired restoration. One and one half millimeters labial reduction for porcelain application should be extended interproximally past the contact area. This allows cleansable contours with minimal metal display. The butt margin for porcelain labial margin must be at a right angle to the root surface. Porcelain labial margins cannot be fabricated on beveled or sloping margins. At least two millimeters reduction on incisal edges of anterior teeth and occlusal surfaces of posterior teeth is needed for porcelain coverage.

b) Single Crowns:

- i) Cases will be mounted at the ADL, at the minimum, in a Type 1 articulator (single hinge). Please prepare the case for mounting by indexing the base of the casts.
- ii) Cases involving multiple single unit crowns should also be submitted to the ADL ready for mounting in an articulator. If a facebow was used, mount the maxillary cast at your base lab and ship with the mounting plate attached. Red index lines should be scribed on the casts if they can be accurately hand articulated. Otherwise, submit the case along with accurate interocclusal records, or stone straps.

c) Die Trimming: The practice of excessively undercutting dies weakens the die, makes the margin very fragile, and contributes to the tendency for laboratory technicians to over-contour restorations. Figure 2 below shows the contours of a properly trimmed die.

- i) The laboratory technician can use a large acrylic bur for gross reduction of excess stone, trimming to within about 1 to 2 mm of the margin (die body area #2 in figure 2).
- ii) Final margin trimming should be done by the dentist using a sharp knife with good magnification and light (marginal zone area #1 in figure 2). A Bard Parker knife with #25 blade, or small “Beaver” blade #SM 67, can be used to allow easier access to the margins. Inexpensive Beaver blade handles can be obtained from Micro-Mark, (<http://www.micromark.com/>) Micro Knife Set Item #81067. DO NOT trim a dry die with a blade, since this will frequently result in chipped margins. Soak dies for approximately 2-5 minutes in “supernatant slurry” prior to trimming with the blade.
- iii) A simple method to make a die soaking system is as follows: Vibrate approximately ½ inch of die stone into a 4 oz medicine jar. After stone sets, add a layer of cotton or gauze over stone and fill with water. Do not use for 48 hours. A few drops of Clorox can be added to reduce bacterial growth.
- iv) The finished die contour should approximate the root structure of the tooth.
- v) The finished base should be smooth and seat fully to place (die base area #3 in Figure 2).
- vi) The base must be flush with the bottom of the die and cannot overlap and “lock” the die onto the base (#4 in Figure 2).
- vii) The long die pin should be in line with the long axis of the prep.

d) Dies, Spacers, and Hardeners: A mechanical dowel pin setting device is recommend (i.e., Pindex) to permit parallel placement of dowel pins.

Extreme care must be taken not to place the dowel pins too deep, in the wrong position, or at the wrong angulation. All teeth and edentulous ridge areas adjacent to abutment teeth should also be pinned and sawed out to facilitate fabrication. Single working dies with a solid cast are also acceptable. Complete arch casts are recommended for any fixed restorations. Quadrant casts may be submitted when using the dual arch impression technique, but are not recommended due to inherent problems with pin mobility and mounting discrepancies. Dies should be no longer than 10-12 mm; otherwise their long lever arms will allow the dies to move and possibly fracture. Dies that are broken and repaired should not be sent to the ADL. Please repour the impression and Pindex the master cast. Dies must be carefully and accurately trimmed and the margins clearly marked with a single fine red wax pencil line. Please do not use cyanoacrylate as a die hardener, because it is too thick. Recommended die

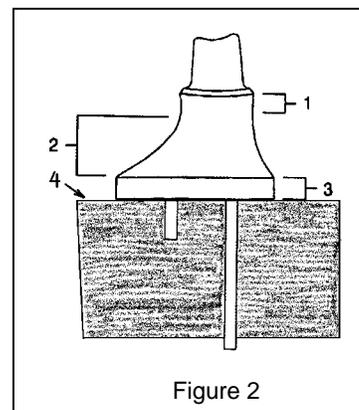


Figure 2

hardeners include those made by George Taub, Whip-Mix PDQ, American Dental Supply and Belle de St. Claire.

- i) The application of die hardener and spacer is the responsibility of the requesting dentist and should be applied prior to submission of the case to the ADL.
  - ii) Die spacer should be placed a minimum of 1.0 mm from the margin and never cover margins on the die.
  - iii) When clinical jaw relation records are necessary to mount the casts, they must be mounted (or lateral stone straps fabricated) **before the spacer is applied**. Previously made occlusal registrations will not accurately fit the dies after die spacer has been applied and will result in an inaccurate mounting. We routinely apply die spacer for you.
  - iv) Die spacers must be applied only to the master die when using transfer dies. This allows the pattern to be transferred from the master die to the working die with minimal difficulty.
  - v) Vident Die Sealer Pen or Belle de St. Claire Die Hardner can be applied.
  - vi) Every spacer we have seen, except cyanoacrylate, is soluble to some extent in the die lubricants we use. Fingernail polish is especially unsatisfactory. Pactra Hot Fuel Proof Model Airplane Dope works well, followed by other commercial dental products.
  - vii) It is important when separating dies not to damage them or destroy too much of the edentulous ridge adjacent to the abutment teeth. This area is critical when establishing proper ridge contact in pontic fabrication.
- e) Second Pour Solid Casts: We recommend that you include a second pour (solid) of master casts with all fixed cases. This gives us a back-up in case something gets broken, as well as adjust interproximal contacts, evaluate the fit of FPD's etc. Carefully pour the impression a second time with vacuum mixed die stone. Separate the casts, and evaluate and trim the margins. The polyvinylsiloxane impression materials (Reposil, President, Mirror, and Extrude) work especially well because of their extreme accuracy over an extended period.
- f) Metal Collars: Metal collars are used on metal ceramic restorations to provide strength and support for the porcelain without overcontouring, and to insure margin integrity. The width of the collar is usually 0.5-1.0 mm depending on the length of the level on the prepared tooth; therefore, a short bevel will permit a smaller collar and give the most esthetic result.
- g) Porcelain Facial Margins: Porcelain facial margins can be made in areas of "critical" esthetics. However, it is essential that the tooth be properly prepared with 1.5 mm shoulder reduction and which has a cavo-surface angle as close to **90 degrees** as possible. The use of a bur with a 1.5 mm diameter to make depth cuts, helps ensure sufficient reduction (Brassler 5837-31-014). Use the bur to measure the depth of the shoulder preparation after completion. **The margin should not be beveled** and should be refined with a hand instrument or tissue protecting, end-cutting bur (Brassler 10839-31-016) to remove unsupported enamel rods. Extend the shoulder preparation to mid-proximal for better translucency and esthetics. The use of a "disappearing metal margin" is highly discouraged as it is always over-contoured.
- h) Full Porcelain Occlusals: If a full porcelain occlusal is desired, please provided additional tooth reduction to accommodate the extra restoration thickness (at least 2mm occlusal reduction). Please remember porcelain occlusals are difficult to adequately refine and they wear excessively on opposing tooth structure. Please communicate your case planning to us involving the opposing teeth. For instance, if planning to crown the opposing tooth in the future, we can idealize the occlusion of that tooth now for a better result later.
- i) Bisque Bake Porcelain: When requesting porcelain in a bisque bake, we will ship the restoration for try-in without polishing the metal since the metal will oxidize when it is glazed. On many ceramic alloys, this film appears to become more tenaciously bound and more difficult to remove each time it forms. If we polish ceramic restorations that still need to be glazed, the final polishing is more difficult and will necessitate removing additional metal; this could result in open occlusal and/or proximal contacts. The metal and porcelain will be micro-blasted with 25µm aluminum oxide.
- j) Porcelains used for PFMs include: Vita VMK 95 and VMK 95 3D (Vident). All-ceramic materials include Empress I and II (Ivoclar) and InCeram (Vident).
- k) Shade Guides: Vita, Vitapan 3D, Chromoscop (for Empress), Vita Alpha and several other porcelains available through the ADL are matched to the Vita Lumin shade guide. Although the Vita Lumin shade guide is adequate for all submissions, some specific products have more detailed shade guides. Please submit these special numbers whenever possible for more accurate shade matching.

- i) Drawings and/or photos are very useful in communicating shade distribution, characterization, etc. Make sure the photos are clear and visually “readable”. This information supplements the shade letter and/or number in section 13 of the DD Form 2322.
  - ii) Requests for characterization or modification of a standard shade should be as descriptive as possible. Include a ratio for a modification such as 3 Parts B-2, 2 Parts A-2, 1 Part 566 (yellow modifier), etc. When requesting a characterization, give its hue and chroma. Don’t just ask for hypocalcification spots, describe them: white, cream, yellow-white and give their chroma as high, medium or low. In addition, please let us know what kind of surface texture you desire on the completed restoration, and the desired finish (high gloss, matte finish, etc.).
- l) All Ceramic Restorations:
- i) Empress 1 – an injection molded leucite-reinforced porcelain used to construct inlays, onlays, veneers, and single unit crowns.
  - ii) Empress II – A lithium disilicate framework ceramic with a new apatite layering ceramic. Minimum framework thickness of 0.8mm. Dimensions of the connector can be a minimum of 4 X 4 mm.
  - iii) Inceram – a glass-infiltrated alumina core material that is covered by an aluminous porcelain veneer.
  - iv) Preparation design:
    - (1) For full coverage crowns, Empress requires a 1.2 - 1.5 mm shoulder preparation with 2.0 mm occlusal/incisal reduction.
    - (2) Inlay and onlay preparations should have no cavo-surface bevels.
    - (3) The veneer preparation requires at least 0.5-0.6 mm reduction of the facial shoulder surface, and 0.7 midfacial. If the incisal edge is to be incorporated into the veneer, 1.5 to 2.0 mm reduction with a rounded shoulder or deep chamfer “capping” the incisal is required. The final impression, solid master cast, and the cast with individual dies are needed for Empress veneers. All Empress restorations will be returned etched, but not silanated. The silane coupling agent required for this and all other porcelains is too unstable to be shipped.
- m) Resin Veneers: Requests for a resin veneer on fixed or removable metal substructures will be fulfilled with Symphony (ESPE-Premier). This material can be bonded to base, noble or high noble metals via retentive beads or the Rocatec (ESPE-Premier) system. Please enclose a Vita shade when requesting a resin veneer.
- n) Resin Bonded FPD: Resin bonded FPD requests should be submitted with a surveyed and designed diagnostic cast. A solid cast may be forwarded or the FPD can be pinned as one large die. Sectioning of the individual abutments causes great difficulty in handling and adjusting the prosthesis. Resistance and retention forms should be designed into the preparation. A prosthesis will only be gel acid etched when requested on the DD Form 2322. Advances in adhesive resin cements now make it necessary to only micro-abrade the internal surface of the resin-bonded FPD prior to luting.
- o) Surveyed Crowns: Surveyed crowns require significant comprehensive diagnosis and treatment planning before ever considering tooth preparation for the fixed restoration. As with all complex cases, accurate diagnostic casts should follow a comprehensive clinical examination. The RPD framework should be surveyed, designed and completely outlined on the diagnostic casts. A surveyor is an absolute necessity. The surveyed crown restorations should be planned to fit the pre-determined RPD design. *You must submit a surveyed and diagnostic design cast **with tripod marks** for this type of case.* Indicate on the cast the desired survey line and placement of undercuts for your surveyed crowns. Surveyed crowns with rests must have adequate reduction for the rests in the tooth preparation.
- i) **Removable Partial Denture Rest Preparations:** After survey and design of the diagnostic casts, prepare all RPD rest preparations and guide planes on the patient. It is important to do this for two reasons. First, it is a lot easier for the dental laboratory to wax a surveyed crown to your already prepared guide planes and rest seats than it is trying to cut preparations in the mouth after the crown is inserted. And second, the final impression of the surveyed crowns allows you a “free” look at the rest preparations etc., and a chance to make corrections before the RPD final impression is made.
  - ii) **Retainer Tooth Preparation:** The tooth preparations for the surveyed crowns may now be accomplished. Be sure to prepare the tooth with the RPD path of withdrawal in mind. The surveyed crown may not necessarily follow the long axis of the tooth because of the path required for the RPD. Axial surfaces may need to be reduced more than normal in order to achieve proper

room for adequate undercuts, reciprocation, and guideplane formation. Additionally, resistance and retention in the form of boxes, grooves and potholes may be required to resist the stress of the RPD clasp assembly. For rest seats, 2.0-2.5 mm reduction is required at the marginal ridge areas. The rest seat should be spoon shaped with further reduction at the base of the seat. This clearance allows for a minimum crown thickness of 1.0 mm in the occlusal rest seat and 1.0-1.5 mm for the RPD metal framework at the marginal ridge. 2.0-2.5 mm clearance is required at the base of the occlusal rest seat. This reduction is especially important on anterior teeth such as maxillary canines. We often see under-reduction in these regions, which result in the crowns being overcontoured. Make a full arch final impression that captures not only the crown preparation, but also that accurately reproduces the contours and preparations of the other RPD abutment teeth.

**6) Removable Partial Denture Frameworks:**

- a) The design for a removable partial denture must be included on a surveyed diagnostic cast when forwarded to an ADL for fabrication. The ADL color-coding system should be followed: Brown for metal outline; blue for acrylic resin; red for areas on teeth that are to be modified; and black for survey lines, soft tissue undercuts; tripod marks, occlusal relationships, and other instructions such as facings, tube teeth, metal pontics and metal with veneers. Draw only the outline of the prosthesis; do not shade in the outline area. Note: Cast clasps are indicated by drawing the outline for the clasp with a double brown line. Clasps drawn with a single brown line indicate that you want a wrought wire clasp or 18 gauge cast round, if annotated. Tripod marks should be a small red cross inside of a blue circle.
- b) Master casts submitted for the fabrication of partial denture frameworks should meet the Cast Preparation standards of section 1. They should be submitted without any design or marks on them with the exception of the patient's name printed on the posterior wall of the base with an ink marker, and tripod marks if desired. Oil, grease, powder, slurry, soap, or other surface contaminations must not be present on the master cast. Casts should be free of bubbles, voids and distortions.
- c) The tongue space, or floor of the mouth, of mandibular casts must be trimmed and smoothed to permit accurate duplication and proper spruing of the case during fabrication. This preparation of the cast is the responsibility of the satellite base.
- d) Reinforced Acrylic Pontics (RAPs) should be selected and positioned at the satellite base and should accompany the case to the ADL along with a trimmed stone matrix.
- e) Good prosthodontic procedures almost always require that a framework try-in be performed before the resin is added to the prosthesis. Only in unusual circumstances will the ADL add the resin before a try-in has been accomplished.
- f) Unilateral "Nesbit" type partial dentures will not be fabricated by the ADL.

g) The sides of the cast should be trimmed parallel to each other and never tapered; this prevents distortion during duplication procedures. Cast thickness should be no more than 15 mm thick. Leave 3 mm land area outside of vestibule. (See Figure 3).

h) The master cast for Ticonium arch bar should be submitted with the design carefully outlined on the cast. The design of the arch bar should approximate, as closely as possible the actual width and extent of the desired appliance. Written

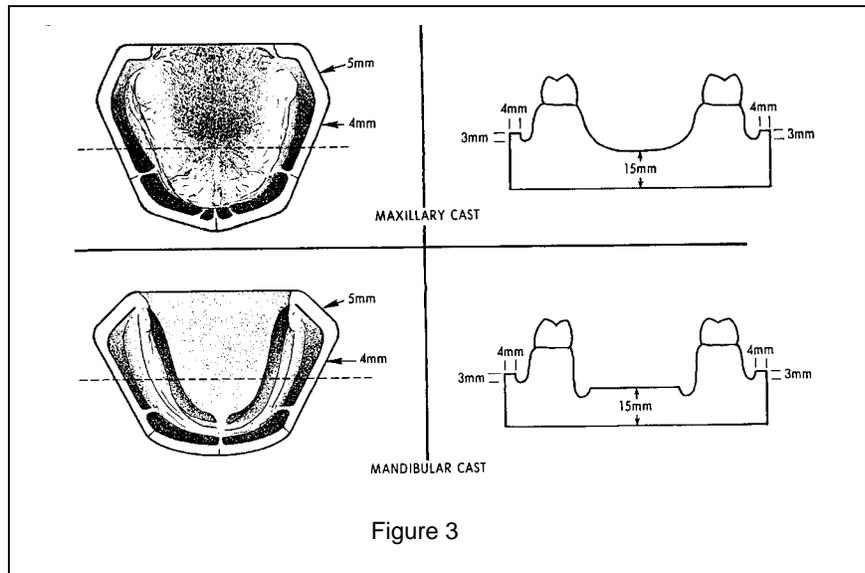
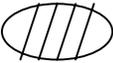


Figure 3

instructions should be provided regarding type and placement of clasps, rests, etc. Instructions should include whether you want mid-tooth or interproximal clasps. If the master cast has a segment which has been cut out and repositioned with wax, a second-pour base should be added to the cast with

dental stone to reinforce the case and help prevent the segments from being separated during shipment or fabrication. It may be necessary to reduce the thickness of the original base on the model trimmer before this second base is added to prevent the overall thickness of the cast from being excessive. Two completed and signed copies of the DD Form 2322 are needed for arch bar cases.

- i) Any submissions requesting any sort of special attachments or component, must include the prefabricated part(s) or the pattern for the part(s).
- j) When communicating RPD designs to the Peterson ADL, please use the following symbols and abbreviations:

Peterson ADL Symbols and Abbreviations		
Black Lines	.....	Survey lines, soft tissue undercuts, etc.
Brown Lines	.....	Outline metal frameworks, wire clasps
Blue Lines	.....	Outline acrylic resin
Red Lines	.....	Rest areas, areas to be relieved or recontoured
Beads	.....	Beads (always write out)
BP	.....	Braided Post
D	.....	Diagnostic cast
Etch	.....	Etched metal (always write out)
M	.....	Master cast
MD	.....	Metal Dummy or metal pontic
MS	.....	Metal Sluiceway
MV	.....	Metal Pontic with Composite Veneer
Onlay	.....	Onlay occlusal surface (always write out)
PGP	.....	Platinum-Gold-Palladium wrought wire
RAP	.....	Reinforced Acrylic Pontic (Must supply matrix and denture tooth with case)
MF	.....	Metal Fill
WW	.....	Wrought Wire (Chromium Alloy)
	(red cross-hatching) .....	Areas to be relieved or recontoured

**7) Complete Dentures:**

- a) In the event that laboratory support for complete dentures is required, the case should be mounted and submitted to the ADL utilizing stable polyvinylsiloxane interocclusal records or lateral stone straps. Preferably the case should be sent to the ADL with teeth already set and ready for processing. However, if the ADL is asked to set the denture teeth, a complete wax try-in should be performed before processing the resin. Wax rims should be included with the cast indicating the high lip line, midline, and corners of the mouth. The maxillary rim must establish the plane to which teeth will be set, and the facial surfaces of the maxillary rim must be contoured to indicate the desired position of the maxillary teeth. THE ORIGINATING DENTIST MUST ESTABLISH THE POSTERIOR PALATAL SEAL IN THE CAST. This is not a laboratory procedure.
- b) Cast Metal Denture Bases: A surveyed and designed diagnostic cast should accompany the master cast. The most satisfactory design covers the palate and ridge crest, but leaves the peripheral borders in acrylic resin. An acceptable variation of this design places the posterior palatal seal area in metal; however this requires exact placement of the posterior denture border by the submitting dentist.

**8) Orthodontic Appliances:**

The design of the orthodontic appliance should be carefully drawn on the master cast indicating the extent of the appliance and location of clasps, rest, springs, etc. Requirements regarding quality of cast, etc. remain the same as those for RPD frameworks.

**9) Implant Restorations:**

Because of the large number of implant parts to each system, and the myriad of screws used in those systems, the ADL is not able to stock any implant parts. Therefore, each submission for any sort of implant prosthesis will require the provider to submit all necessary implant components for the fabrication of the prosthesis. This includes abutments, plastic patterns, polishing caps, and especially

laboratory screws. Screws and other reusable components will be returned with the case. To ensure their return, it is recommended that you list them on the DD Form 2322.

**10) “RUSH” Cases:**

- a) The date a case is received in the ADL will usually determine the priority of the case.
- b) Requests for “RUSH” service must be accompanied by a written letter of justification explaining why the case should be given special consideration over all other cases in the ADL, including others from your facility. Deploying personnel will always be given immediate priority over all other cases.
- c) Leave and/or normal PSC moves of the patient and/or doctor are not considered an adequate reason for requesting “Rush” treatment of cases. It is the responsibility of the clinician to determine that adequate treatment time exists for the patient and/or doctor before the case is started.

**11) Request for Special Projects:**

- a) Requests for special projects or special castings such as dowel pins, Ticonium posts, reduction gauges, or research specimens will be made on a DD Form 2322 and submitted in the same manner as other cases. Enter the requesting doctor’s name in Item #4 of the DD Form 2322 and enter “Special Project” in Item #12. Include in Item #26 the number of pins, posts, etc. being requested.
- b) Requests for jewelry, insignia, and other unauthorized items will not be honored.

**12) Request for Consultation Services:**

- a) Consultation requests must include the following:
  - i) Duplicate copies of DD Form 2322, or SF Form 513, along with all essential information, including a brief, but adequate patient history.
  - ii) A recent set of accurate casts with proper orientation.
  - iii) Current full mouth radiographs or panorex.

**13) Packing for Shipping Procedures:**

- a) Ensure all cases are packaged properly for shipment so that breakage will not occur.
  - i) Place only two casts in each box. Casts must be in plastic bag.
  - ii) Use a separate shipping container for pre-operative casts, stone straps, etc.
  - iii) Do **not** leave dies in the cast during shipment. Remove all dies from casts and place them in a separate container such as pillbox or bottle with sufficient padding to protect them.
- b) **Patient’s name must be written in waterproof ink on the back of the casts.**
- c) List all items enclosed in the shipping boxes on the DD Form 2322.
- d) Do **not** split-pack cases! When more than one shipping box is required, wrap the boxes together as a single package so that they will arrive in the ADL at the same time. Place a copy of DD Form 2322 in each box and write on the top of the form, “one of two (or three) boxes”. Make sure a mailing label with a current address is on each box. Also please include your DSN phone number. Remove the carbon pages from the DD Form 2322 and place it on top of the foam (not between the foam and the casts, to prevent them from getting badly wrinkled and smudged in the mail.
- e) The most preferable method is to carefully wrap the boxes with a suitable wrapping paper and secure adequately with reinforced tape. Do not use fire resistant paper since it tears easily and **DO NOT PLACE TAPE DIRECTLY ON THE SHIPPING CONTAINER.**
- f) Infection Control Procedures: Dental cases are contaminated and they must be wrapped in plastic before placing them in the shipping container. Impressions, casts, interocclusal records, prostheses, etc., must be disinfected and wrapped in a plastic bag before placing them into the shipping container. We are required by Air Force Directives to discard the shipping container and packing material of all cases that arrive in the ADL not handled in this manner. As you know, shipping containers and foam rubber inserts are too expensive to waste, so we ask your cooperation in complying with these Infection Control Procedures.

**14) Questions:** Before submitting the case, any questions related to the submission of cases to the ADL should be directed to an ADL officer. The practice of prosthodontics is demanding and we desire, as you do, to provide the highest quality treatment of our patients. By following these Submission Standards, we should be able to achieve this goal.

**15) Administrative Considerations:**

- a) The Area Dental Laboratory (ADL) Officer, under the direct supervision of the Dental Squadron Commander, supervises the overall operation of the ADL and is responsible for providing dental laboratory support and professional guidance to satellite bases consistent with guidance provided by AFD 47-1, AFI 47-101, and AF Pamphlet 162-6.
- b) Providers submitting cases to the ADL must do so in accordance with established standards and procedures as outlined in these submission guidelines. **An accurate return address and DSN telephone number are required.**

- c) Services provided by the ADL:
- i) **Fixed Prosthodontic Services** include all **gold restorations** (cast post and cores, fixed partial dentures, full and partial veneer crowns, inlays and onlays, and surveyed crowns), **metal-ceramic restorations** (crowns, fixed partial dentures, and resin-bonded [Maryland bridges]), **all-ceramic restorations** (crowns [Empress {Ivoclar}, Inceram {Vident}], inlays and onlays [Empress I and II], and veneers [Empress, and Vita Alpha {Vident} Porcelain]), **precision and semi-precision attachments**, **Crown and bridge resin** for crowns, veneers, and pontic facings, and **Resin-bonded fixed partial dentures** (Rexillium V alloy [Jeneric/Pentron] with Vita VMK 95 and VMK 95 3D [Vident] porcelains).
  - ii) **Removable Partial Denture Services** include removable partial denture acrylic resin – all phases, removable partial denture frameworks (nickel-chrome), and repairs (resin and metal).
  - iii) **Complete Denture Services** include cast metal denture bases, complete dentures - all phases, Immediate, transitional, and overdentures - all phases, and denture attachments.
  - iv) **Implant-Supported Prosthodontic Services** include bar attachments, fixed prostheses, fixed-removable prostheses, and removable prostheses
  - v) **Appliances/Stents/Trays** include athletic mouth guards, bleaching trays, custom ear pieces, custom impression trays, custom stents, orthodontic/pediatric appliances, orthoses (night guards), and snore guards.
  - vi) **Specialty Services** include electric discharge machining (spark erosion), soldering, and special projects.
  - vii) **Consultation services** of two board certified prosthodontists with over 20 years of experience.
  - viii) **Information letters** to satellite personnel
  - ix) **Training** includes annual ADL Workshops for satellite bases, dental laboratory officer and technician training upon request, and satellite visits upon request.
- d) **Dental Laboratory Prescription:** Complete all applicable portions of the DD Form 2322. Please type the information for best clarity. Enter the complete name and address of your base (DO NOT abbreviate), including ZIP code. **Include your DSN number where you can be contacted, as well as your e-mail address** in item #2 of the authorization form, and please ensure that the number you provide is the correct current working number. We have expended great effort at times trying to make a phone call to the submitting dental officer, only to discover that he/she has provided the wrong telephone number. Work authorizations must be filled out accurately and completely and signed in ink by the submitting dentist. **Three copies of the DD Form 2322** (or other appropriate forms) are required for all cases involving expenditure of precious metals. **Two copies are required for all other cases.**
- 16) The Peterson ADL may refuse to accept any case not prepared or submitted in accordance with established standards and procedures.

ALLAN D. LINEHAN, Lt Col, USAF, DC  
Area Dental Laboratory Flight Commander

# **Attachment 1**

## **The Pindex Method of Dowel Pin Removable Dies**

*Lt Col Allan D. Linehan, DMD, MS*

- 1) Introduction: A *working cast* is a cast used to duplicate the patient's prepared tooth or teeth, the adjacent teeth present in the arch, and all associated soft tissue structures. It is used to establish the shape, proximal contacts, occlusion, and fit of fixed prostheses, from the simplest inlay to the most complicated complete mouth rehabilitation. A *die* is a positive reproduction of the prepared portions of a tooth in a hard, stable material such as improved stone. (Less commonly used die materials are, dental amalgam, acrylic resin, epoxy resin, or electrodeposits of metal.) Dies are composed of two parts: the duplicate of the prepared tooth, and an extension of die material or some other material. A die, by itself, has limited value until its relationship with adjacent and opposing teeth is established. A working cast contains one or more dies. Dies are either part of a working cast or they are not. For those dies that are not, the extension is a convenient grip and nothing more. Dies that are part of a working cast are frequently made to be removable, and their extensions are keyed in some manner. Because of the key, the die will not rotate and it can be placed back in the cast in the same position after every removal. Dies can be keyed in a variety of ways. One could carve facets on the extension, a very time consuming process, or make the extension from a commercially available metal dowel pin. In this summary, the Pindex dowel pin method is described.
- 2) The Pindex method: Dies and working casts are fabricated as a unit from the same tray impression. Working casts can be made with removable stone dies by pouring the arch portion of an impression first, and then pouring the rest of the working cast around the commercially prepared extension, the Pindex pins and sleeves. An improved stone intended for the fabrication of dies is used for the first pour. A less expensive low expansion stone is used for the second pour.
- 3) Two dowel pins are used for each prepared tooth, adjacent tooth, or edentulous space. One of the pins is long and one is short. Remaining quadrants or sextants of the teeth require pins as well, but the entire block can be pinned with two long pins, or two long pins and one or two short pins. Pinning the adjacent teeth allows for removal of these teeth and makes it easier to evaluate the contact areas one contact at a time. At times, the only way a die will come out of the base is to make the adjacent teeth removable too. Making the edentulous ridge between the two abutments of an FPD removable has definite advantages in shaping and finishing fixed partial denture pontics. A final impression for a fixed prosthesis is most commonly an elastomeric material such as Vinyl Polysiloxane or Polyether. Impressions made with such materials are much less susceptible to temperature and humidity changes and they are stronger than hydrocolloid. Elastomeric materials allow more than one pour from the same impression. Hydrocolloid impressions may only be poured accurately once.
- 4) Preparing the elastomeric impression for pouring:
  - a) The impression must be cleaned first by rinsing with cold water to flush away saliva and debris. Liquid soap or unset dental stone powder is a recommended aid in cleaning the impression. Sprinkle on the stone powder or pour liquid soap into the impression and wash using a soft paintbrush. Saliva and debris harbor bacteria, and can cause the surface of the stone to become chalky and abrade easily.
  - b) Dry the impression with a gentle stream of air.
  - c) The use of a commercially prepared surfactant is recommended to reduce voids in the impression. Dry it thoroughly after spraying it on. Wet areas of pooling surfactant weaken the stone and also cause the stone to become chalky and abrade easily.
  - d) Pour the impression in two stages:
    - i) The first stage is poured in improved die stone. Make the pour sufficiently thick, about 15 mm from the bottom of the cast to the die margin. Let the stone set completely, and carefully remove the arch from the impression. Next trim the base against a cast trimmer to create a flat surface. The surface must be very smooth. An ortho trimming wheel makes a nice surface, but 360 grit wet/dry sandpaper on a flat surface will work equally as well. Trim the lingual of the arch so that there is a line of draw to allow the dies to be removed. Then set it aside and allow it to dry completely.
    - (1) Plot each pinhole location on the surface of the first stage pour using a pencil. Drill two holes, one buccal, and one lingual on each prepared tooth. Center the holes mesio-distally, and align the long pin with the long axis of the prep when possible. The holes must be far enough apart facial-lingually so that there is room for the plastic sleeves and their respective collars. Drill two pinholes in teeth adjacent to the crown or FPD in the same manner as for each prepared tooth.

Drill two pinholes for each edentulous area as well. Large sections on the opposite side or anterior of the arch should be drilled with a minimum of two pinholes, but four is more commonly used. Pinholes must be drilled to the correct depth so that the shoulder of the pin is flush with the surface. If not, the second pour will capture the pin and either the base or the die will break. Take some time to set the drill bit correctly in the Pindex machine so that pinholes are drilled to the proper depth.

- (2) Using a small amount of cyanoacrylate cement, lute the pins into the pinholes. Try to apply just enough cement to avoid any excess being squeezed out. Any excess cement should be wiped off immediately using a cotton-tipped swab. First place short pins into the lingual pinholes. Place long pins into the facial pinholes. Placing the short pins first makes it easier to place them without the long pins getting in the way. Place two long pins into the quadrant or sextant blocks. If you have drilled more than two pinholes, place short pins in the remaining pinholes. It is suggested that the short pinholes be marked first to accurately place the pins. **Check to see that all of the long pins are parallel to each other!**
  - (3) Place gray plastic sleeves over the short pins, and place white plastic sleeves over the long pins.
  - (4) Paint a separator over the entire base. Super-Sep™ (Kerr Lab) is wax dissolved in a solvent and works very well. There are other commercial products available. Although a very thin coat of petroleum jelly will work, if it is spread on too thick correct seating of the dies will be compromised. Without a separator, it may not be possible to separate the first stage pour from the second.
- ii) The second stage is poured from a low expansion stone. Type II or III stone works well for this. There are several methods for containing the second pour.
- (1) One method uses wax to block out the tongue or palate space, and a former of boxing wax wrapped around the outside contains the flowing stone. This method requires that the wax be sealed to the cast, and kept off of the flattened base. The advantages of this method is that it is possible to pour the stone without any voids around the pins and sleeves, and it keeps the stone off of the teeth of the cast. The tops of the pins are also clear of stone if poured just to the top of the plastic sleeves. The disadvantage is the time it takes to fit and seal the boxing wax.
  - (2) A more common method is to apply some stone carefully to the base of the cast around the pins and sleeves, and then to invert it into a stone-filled base mold. The Pindex mold is the same height as the long pins, and should be filled just to the top with stone. Done correctly there should be no excess stone. If excess stone is present, wipe off the excess on the lingual with a finger before the stone sets. The facial will be trimmed off at the next step. Conversely, if there is not enough stone, voids under the dies and around the pins are created. The Pindex mold is made of rubber and can be easily peeled off of the base once the stone has set. It is critical that the first stage cast with the pins has been trimmed on the lingual to create a line of draw prior to embedding it in the base. Otherwise, the dies cannot be removed. The advantage is speed with this method. The disadvantage is without a great deal of care, stone can slop onto the teeth and ruin the dies. Another problem is the presence of voids under the dies and around the pins.
  - (3) With either of the above methods, wait until the second pour reaches final set before proceeding.
- e) Trim the cast. The slush that splashes off a wet trimming wheel can ruin a working cast. If precautions are not taken, debris will cling to the surfaces of the cast making them inaccurate. Before trimming, soak the cast in a saturated solution of SDS (**S**aturated calcium sulfate **D**ihydrate **S**olution) for about a minute. SDS is made by immersing a blob of set stone in distilled water for 72 hours. Part of the stone will dissolve in the water and create a clear liquid solution. The resulting liquid will not dissolve your working cast. Use the same die stone for best results. Use clean stone and not a discarded cast to make SDS; this reduces bacterial growth in the solution. As an additional protection, cover the cast's arch form with tissue wetted with SDS. After trimming, thoroughly rinse the cast in SDS. **Do not rinse in running tap water! It will abrade the cast and make it inaccurate!** Blow dry and set aside for at least 30 minutes. NOTE: Never saw out dies or doweled teeth and pop them loose before the cast trimming procedure is done. A die, once removed, will not return to place if trimming slush gets into the dowel pinhole.

- f) Accurate seating of a working cast in a jaw relationship record, together with mounting working casts in an articulator, are best done before dies are sawed and tapped out for the first time.
- g) Clear any stone away from the tops of the pins. Before mounting, plan on keeping the pins clear by placing wax or clay over them. This will have to be done with the method of inverting the cast into a base. Carefully remove the entire arch at once, and using a large acrylic bur, trim each of the long pinholes about 2 mm. Blow out the holes of dust before attempting to re-insert the dies.
- h) Draw cutting lines. Looking from the occlusal. Draw lines facially and lingually to help guide your saw cuts. Draw lines to reflect how the blade will have to pass through the proximal area. Maxillary molars generally need an angled cut. Drop vertical lines using the long pins as a guide. Connect the facial and lingual lines across the base if sawing from the base up as needed. Be also mindful that at least 2 mm of stone should remain on each side of the pin, otherwise the stone may break and the die then not return accurately to place.
- i) Using a flat-bladed die saw, cut from the gingival crest areas mesial and distal to a preparation or doveled tooth, down to the junction between the first and second pours of the working cast. If there is very little room between the adjacent tooth and the margin and sawing may damage the margin, a #0000 jeweler's saw blade can be used to cut down a few millimeters. The dies are then inverted onto a towel and a die saw is used to cut from the base up to the first cut made by the jeweler's saw. As it is difficult to exactly match the two cuts together, it is possible to cut within 2 to 3 mm and then break the dies apart. Apply pressure to force the dies together at the base, and it will snap apart.
- j) A highly skilled technician should be able to accurately place the pinholes and make the die cuts parallel to the pins so that each die can be removed independently of the other. Some trimming is necessary for the dies to clear one another, especially if snapped apart as described above. If the teeth are tipped this may not be possible. Rough trim excess stone, staying away from the margins of prepared teeth.
- k) The cast is now ready to turn over to the dentist for final trimming of the dies.

**Attachment 2**

**PFM Design Options**  
Mr. Donald T. Meaney

**Peterson ADL Fixed PFM Design Options**

10 DS, OL-C/SGDA 1045 E. Stewart Ave. Peterson AFB CO 80914-9045 DSN: 834-1600

Provider: \_\_\_\_\_

Patient: \_\_\_\_\_

**Anterior Design (AD) Options**

Porcelain Margins

AD-1 AD-2 AD-3 AD-4

Metal Circumferential Margins

AD-5 AD-6 AD-7 AD-8 AD-9

AD-10

Draw Your Design

AD-\_\_\_\_\_

Make Your Selection

**Anterior Pontic Design (APD) Options**

APD-1

Modified Ridge Lap

APD-2

Ovate, Filling Tissue Depression

APD-3

Draw Your Design

APD-\_\_\_\_\_

Make Your Selection

**Posterior Design (PD) Options**

Porcelain Margins

PD-1 PD-2 PD-3 PD-4

Metal Circumferential Margins

PD-5 PD-6 PD-7 PD-8 PD-9

PD-10

Draw Your Design

PD-\_\_\_\_\_

Make Your Selection

**Posterior Pontic Design (PPD) Options**

Perel

Hygienic

Bullet

Mod. Ridge Lap

Ovate

PPD-6

Draw Your Design

PPD-\_\_\_\_\_

Make Your Selection

Lay-out and Illustrations by Mr. Donald T. Meaney