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TECHNICAL BULLETIN

AREA DENTAL LABORATORY PROSTHODONTIC SERVICE

HEADQUARTERS, DEPARTMENT OF THE ARMY

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AREA DENTAL LABORATORY PROSTHODONTIC SERVICE

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Illustrations

***This bulletin supersedes TB MED 148, 30 December 1985.**

CHAPTER 1
INTRODUCTION

1-1. General

The U.S. Army area dental laboratory (USAADL) performs professional prosthodontic and dental laboratory support for oral health activities of the uniformed services as directed by Headquarters, U.S. Army Health Services Command. Support includes professional guidance, consultations and diagnostic services; dental laboratory services and fabrication of prostheses for restoration and replacement of lost tissue; specialized training and education programs; publication of informational and instructional material for professional and technical personnel; support and conduct of applied research; and development testing and evaluation of doctrine, techniques, equipment, and other materials.

1-2. Organization

Every U.S. Army dental clinic is provided with dental laboratory support. This support is divided into two distinct categories that include the local dental laboratory support and the area dental laboratories (ADLs).

a. Local dental laboratory support. The organization of the dental activity (DENTAC) laboratory support is best determined by the DENTAC commander and his or her designated laboratory officer.

b. Area dental laboratories. There are four large, full-service area dental laboratories staffed by 40 to 100 dental laboratory technicians and each is commanded by a dental officer. These laboratories are located throughout the United States and each supports a specific region and a designated number of DENTACs.

c. Locations.

(1) USAADL, Walter Reed Army Medical Center, Washington, DC 20307-5200.

(2) USAADL, Fort Gordon, GA 30905-5650.

(3) USAADL, Fort Sam Houston, TX 78234-6200.

(4) USAADL, Alameda, CA 94501-1022.

d. Services the ADL provides.

(1) *Construction and repair.* Construction and repair of dental restorations and prostheses of all types, including fixed and removable partial dentures; complete dentures; orthodontic and pedodontic appliances; surgical, and radiological splints and prostheses; mouth protectors; temporary or interim restorations; and patient education models and teaching aids.

(2) *Consultation services.* Requests should be submitted in duplicate, together with full arch diagnostic casts, an interocclusal record, and panoramic radiograph and/or periapical series. All necessary clinical information should be included under clinician's remarks.

(3) *Consultant visits.*

(4) *Continuing education.* Dental clinical-laboratory relations courses will be presented as directed by the Office of The Surgeon General. Other continuing education activities will be held as required.

(5) *Publications.* Publication of informational and instructional material for professional and technical training.

e. Dental laboratory consultant and coordinator. The Assistant Surgeon General for Dental Services has appointed a consultant for ADL services who also serves as a dental laboratory coordinator.

(1) This officer maintains active liaison with—

(*a*) The ADL commanders.

(*b*) DENTAC commanders.

(*c*) Designated Air Force and Navy dental officers.

(2) The consultant will monitor Army workload and adjust the workload by requesting transshipping between ADLs and recommending negotiation of interservice support agreements. Upon mobilization, the coordinator will take action through appropriate command channels to ensure expeditious fabrication of all essential dental prostheses within the prescribed health service area for support of the expanded Army after M-Day for either a partial or full mobilization.

1-3. Education and training

a. Each ADL conducts formal courses designed to acquaint dental officers with the role of ADLs in the clincial practice of prosthodontics. Considerations in case selection as well as case submission are identified for complete dentures, removable partial dentures (RPDs), and fixed partial dentures. Established techniques are presented to enable the clinician to fully utilize the dental laboratory. Specific subject areas include prescription writing, centric jaw relation records, master casts

and dies, ceramic alloy restorations, repairs, packaging, and mailing. The student views incoming and outgoing work as well as actual construction techniques and participates in a practical laboratory exercise.

b. Videotapes are available to familiarize dental officers with ADL utilization. These may be obtained from the Media Division, Academy of Health Sciences, US Army.

(1) VT 202, A Tour of an RDA (ADL).

(2) VT-933, TB MED 148.

(3) VT-934, Centric Jaw Relations for Removable Prosthodontics.

(4) VT-935, Centric Jaw Relations for Fixed Prosthodontics.

c. DENTACs may request to send dental officers or technicians to an ADL for familiarization or specialized training in specific areas.

CHAPTER 2

ADMINISTRATIVE CONSIDERATIONS

2-1. Policies

a. To enhance the efficiency of the DENTAC Laboratory System and to control ADL workload, the following procedures should be accomplished in local dental laboratories if possible:

(1) Custom trays.

(2) Occlusion rims.

(3) Transitional partial dentures.

(4) Single all metal cast restorations.

(5) Simple metal (type III gold) fixed partial dentures.

(6) Acrylic resin processing.

(7) Partial and complete denture setups.

b. Only those above procedures which are beyond the capability of the DENTAC may be requested from the ADL. Direct communication between the DENTAC commander or his or her laboratory officer and the servicing ADL commander is encouraged for coordination of dental laboratory work that cannot be accomplished at the DENTAC.

2-2. Use of DD Form 2322 (Dental Laboratory Work Authorization) (see figs 2-1 and 2-2)

a. The dentist is legally responsible for providing the dental laboratory specialist with detailed and specific directions for fabrication of the requested dental appliance. He or she must provide a correctly completed and signed work authorization.

b. This form will be completed in duplicate and the file copy retained as an audit trail for precious metals and composite laboratory value (CLV) reporting as prescribed by DA Pam 40-16 for RCS MED-376 (R1) and RCS MED-389. (See app B.)

c. It is extremely important that the administrative data in blanks 1 through 28, where applicable, be completed and typewritten or handwritten legibly. Specific guidance is provided as follows:

(1) *Block 1.* Enter the Local Case No. as follows:

(*a*) The ADL master station computer code for that DENTAC or clinic. (*Example*: Walter Reed Station Computer Code: 2000.)

(*b*) Month initiated (1 through 12).

(*c*) Individual clinic case number.

(*d*) Example: 2000-6-027; this number goes in block 1.

Note. The information in block 1 is designed for computer input and will establish an authorization, cost analysis, and material requirements for this particular patient beneficiary type.

(2) *Block 2.* Enter the complete mailing address and AUTOVON telephone number of the submitting clinician to include the ZIP code.

(3) *Block 3.* The ADL Case No. will be provided by the ADL.

(4) *Block 4.* Enter the patient's name as shown in figure 2-1.

(5) *Block 5.* Enter the patient's complete social security number. This is extremely important in order to validate patient eligibility and provide a basis for the expenditure of Federal funding. A prescription submitted without this information will result in an administrative delay to obtain this documentation from the clinician.

(6) *Block 6.* Grade: Utilize the pay grade of the sponsor; that is, E-1 to E-9, O1 to O10, W-1 to W-4; civilian grade GS1 to GS15; or other appropriate abbreviation.

(7) *Blocks 7 and 8.* See figures 2-1 and 2-2 for examples.

(8) *Block 9.* Beneficiary type. The service category is required by Department of Defense (DOD) directive. The following abbreviations will be utilized:

(*a*) First code character:

1 Army—1.

2 Navy and Marine—2.

3 Air Force—3.

4 Other—4.

5 Family Member—5.

(*b*) Second code character:

1 Active Duty—1.

2 Retired—2.

(*c*) Example in block 9: 1-1, Army—Active.

(9) *Blocks 10 and 11.* See figures 2-1 and 2-2 for examples.

(10) *Block 12.* Type of Prosthesis or Restoration: Utilize the CLV definition codes (app B) for the procedure requested.

(11) *Blocks 13 through 28.* See figures 2-1 and 2-2 for examples.

d. The laboratory data part of DD Form 2322 (reverse side) is for laboratory use only and is self-explanatory.

2–3. Priority in laboratory service

When time is a critical factor, the station may request a priority or "RUSH" fabrication. In this event, the prescription must show in block 26 a suspense date that will satisfy the military requirements of the patient. The continual workload at the ADLs necessitates that priority service requests be justifiable. Leave and/or normal permanent change of station (PCS) moves of the patient and/or doctor will not be considered as an adequate reason for requesting expeditious 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. Ensure that the doctor's phone number is on the DD Form 2322 so that when required the ADL may call to negotiate a final suspense date.

2–4. Quality control

All dental officers will comply with the provisions of this bulletin when submitting cases to an ADL. Every effort will be made by the ADL to follow the recommendations of dental officers concerning design, method of fabrication, and materials, but the final decision rests with the ADL commander who is authorized to return cases with appropriate remarks for correction or consultation. Upon the receipt of a properly signed request the ADL assumes that the DENTAC commander of the submitting station has approved the patient's eligibility and the treatment procedure. All prosthodontic prescriptions will be countersigned and dated as designated by the DENTAC commander. When available, the DENTAC commander will designate a trained prosthodontist as his or her prosthodontic monitoring officer to be responsible for the control and utilization of prosthodontic assets. He or she should evaluate and legibly sign all prosthodontic cases being submitted to an ADL by nonspecialists.

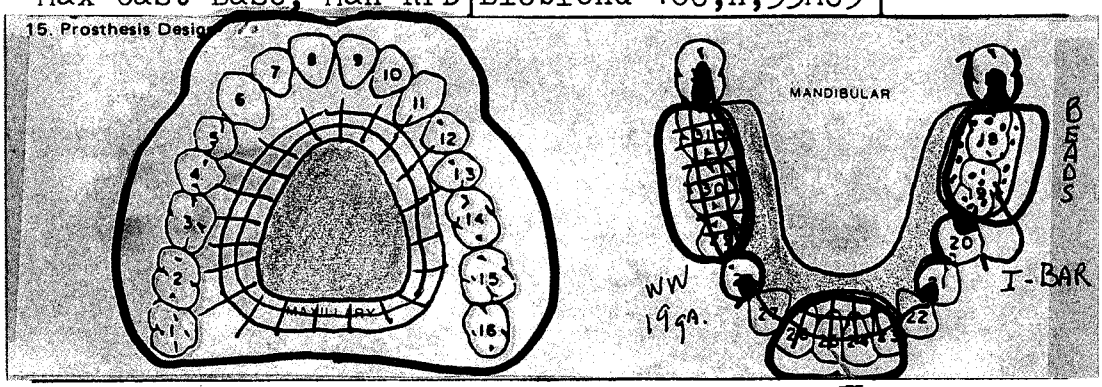
4015-1-10 1. Local Case No.	Dental Clinic #3 USA DENTAC Fort Hood, TX 76544-5063 737-1620 2. Name of Treatment Facility, Mailing Address & Autovon No.	1-113 3. ADL Case No.

4. Patient's Name *(Last, First, Middle Initial)*	5. SSN	6. Grade	7. Age	8. Date Initiated
Smith, Donald E.	558-42-1410	E-7	37	9 Sep 89

9. Beneficiary Type	10. Organization, Duty and Home Telephone Nos.	11. Date Forwarded
1-1	HQ Co, 3rd Bn 737-1410	

12. Type of Prosthesis or Restoration	13. Shade and Mold by Guide	14. Date Delivered
Max Cast Base, Man RPD	Bioblend 106,H,33M65	

15. Prosthesis Design



Request(s) *(Check appropriate box(es))* 16. ☐ Framework Only 17. ☒ Set-up

18. ☐ Process 19. ☒ Fully Fabricate 20. ☐ Bisque Bake 21. ☐ Consultation

Inclosed Items

22. ☐ Diagnostic Casts 23. ☐ Jaw Relation Record 24. ☐ Radiographs 25. ☐ Other *(See remarks)*

26. Clinician's Remarks/Instructions

Set teeth in cross bite at left
Extra relief over mandibular tori

27. Typed Name and Grade of Dental Officer	28. Signature
LTC Robert A. Camp, DC	Robert A Camp

DD Form 2322, 83 Oct — Replace DA Form 2868, Oct 64, which is obsolete. — Dental Laboratory Work Authorization

(PRESS HARD IF HANDFILLED)

Figure 2-1. Sample request for removable prosthodontics.

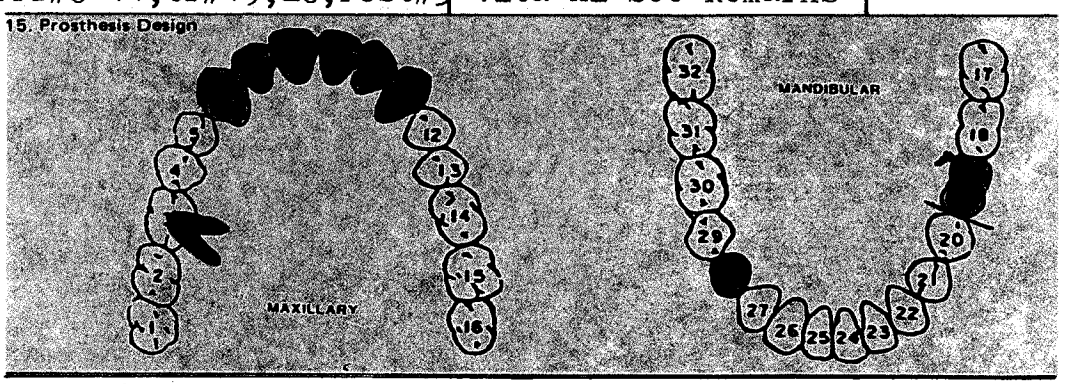
	Stout Dental Clinic USA DENTAC	
3045-2-12 1. Local Case No.	Fort McClellan, AL 36205 865-3216 2. Name of Treatment Facility, Mailing Address & Autovon No.	2-365 3. ADL Case No.

4. Patient's Name *(Last, First, Middle Initial)*	5. SSN	6. Grade	7. Age	8. Date Initiated
Raabe, Marcella F.	423-67-2351	E-2	27	10 Sep 89

9. Beneficiary Type	10. Organization, Duty and Home Telephone Nos.	11. Date Forwarded
5-1	K-9 Co, MP School 865-2530	

12. Type of Prosthesis or Restoration	13. Shade and Mold by Guide	14. Date Delivered
FPD#6-11,Cr#19,28,Post#3	Vita A2 See Remarks	

15. Prosthesis Design



Request(s) *(Check appropriate box(es))* 16. ☐ Framework Only 17. ☐ Set-up

18. ☐ Process 19. ☐ Fully Fabricate 20. ☒ Bisque Bake 21. ☐ Consultation

Inclosed Items

22. ☒ Diagnostic Casts 23. ☐ Jaw Relation Record 24. ☐ Radiographs 25. ☐ Other *(See remarks)*

26. Clinician's Remarks/Instructions

Copy esthetics of inclosed diagnostic wax up.
Surveyed Cr #19, mesial rest and guide plane, DL ret.
Cast tripoded to RPD path of insertion.
Full Porcelain occlusal #28.
Cast post #3 in base metal alloy.
Shade BF 52 tooth #28.
Do not finish margins.

27. Typed Name and Grade of Dental Officer	28. Signature
MAJ Marcus F. Patridge, DC	Marcus F Patridge

DD Form 2322, 83 Oct Replace DA Form 2868, Oct 64, which is obsolete. Dental Laboratory Work Authorization

(PRESS HARD IF HANDFILLED)

Figure 2-2. Sample request for fixed prosthodontics.

CHAPTER 3
OPERATIONS

3-1. Clinical considerations

Pre-treatment aids, including full mouth radiographs and diagnostic casts should be utilized to determine the final treatment plan for each patient who is to receive prosthodontic care. Modifying considerations such as patient status, time available to complete treatment, and patient interest and ability to perform required oral health maintenance procedures must be recognized.

a. Abutment selection for fixed partial dentures should follow accepted guidelines and provide adequate support for the intended prosthesis. The use of cantilever fixed partial dentures should be carefully evaluated.

b. Intra-coronal retainers (inlays) are undesirable for fixed partial dentures.

c. The properly prepared partial veneer crown (¾ crown and its modifications) is an excellent preparation. Its use conserves tooth structure and preserves natural tooth contours.

d. Fixed restorations of eight or more units, or requests for appliances utilizing commercially designed attachments, unless submitted by a trained prosthodontist, will be referred to the ADL for consultation prior to tooth preparation.

e. Individual crowns and fixed restoration involving teeth of little or no esthetic significance are more serviceable if they are not veneered with porcelain.

f. Guidance by the clinician is necessary in order for the ADL to achieve proper esthetic results. The use of a diagnostic waxup, casts showing previous esthetically acceptable prostheses, photographs, or other methods of communicating tooth form, size, shade, and arrangement are encouraged.

g. A prosthodontic restoration is not indicated unless a significant improvement in mastication can be achieved, esthetics improved, or movement of the remaining teeth prevented.

h. Acid etch prosthodontic restorations should be limited to anterior restorations, orthodontic retainers, or periodontal splints.

3-2. Requirements for mouth preparation

Proper mouth preparation is essential for the success of any dental prosthesis, and there are certain principles of mouth preparation that must be considered for each type of restoration.

a. Complete dentures. Some casts sent to the laboratory for the construction of dentures show evidence of unusual tissue conditions which raise questions as to the need of tissue conditioning or correction. An explanation of these conditions in the Clinician's Remarks/Instructions, block 26 of DD Form 2322 is necessary to guide technical procedures.

b. RPDs. Mouth preparation for RPDs necessitates the following considerations, many of which can only be appreciated by occluding the diagnostic casts and analyzing them with a dental surveyor.

(1) Irregularities of the occlusal plane, which should be corrected by occlusal equilibration, extraction of the offending teeth, the insertion of onlays or crowns, etc.

(2) Disharmonies of occlusion.

(3) Lack of sufficient interocclusal space—

(*a*) For denture bases and artificial teeth.

(*b*) For rests, indirect retainers, connectors and clasp arms. A minimum clearance of 1 mm must be provided in all tooth contacting relations for occlusal, incisal, and cingulum rests, and indirect retainers. Sufficient space must also be made for that metal that connects the rest to the remainder of the prosthesis. When the anterior palatal tissues are to be covered by metal, a clearance of 1 mm is necessary between the incisal edges of lower anterior teeth and the palatal tissues. When clasp arms cross over incisal or occlusal surfaces, as with embrasure or crib clasps, a cross-sectional space of 1.5 mm is required at the embrasure for *each* clasp in all occluding relations.

(4) Recontouring of tooth surfaces may be indicated for the following reasons:

(*a*) To parallel surfaces which provide the guiding planes that direct the path of insertion and removal.

(*b*) To minimize undesirable undercut areas and unhygienic spaces.

(*c*) To reposition heights or contour that are unfavorably close to the occlusal surfaces or incisal edges and do not permit proper clasping.

(*d*) To create or position areas favorable for retention. This may necessitate the placing of a restoration.

(*e*) To permit the positioning of major connectors in proper relation to the linqual tissues.

(*f*) When RPDs are to include occlusal or incisal onlays, the corresponding tooth surfaces may require smoothing to minimize pits and fissures. In instances of exceptionally deep faults, fixed metallic restorations may be indicated.

(*g*) To improve esthetic results, recontouring the proximal surfaces of teeth adjacent to edentulous spaces facilitates the use of appropriate artificial teeth and minimizes unsightly spaces gingival to the contact points. Recontouring to reposition heights of contour in a gingival direction may minimize the display of clasp arms.

(5) Occlusal rest form:

(*a*) Should cover one-third of the faciolinqual width of the occlusal surface.

(*b*) Should extend toward the center of the occlusal surface a distance comparable to its width.

(*c*) The floor of the preparation should be spoon-shaped, without undercuts, and basically at right angles to the long axis of the tooth with a slight deepening toward the center of the tooth.

(*d*) The cavo-surface outline should be well rounded to include rounding of the marginal ridge. Sharp angles and box formations are contraindicated because they induce destructive torques and interface with the seating of the framework.

(6) Incisal rest form:

(*a*) The floor should be basically at a right angle to the long axis of the tooth, with a slight deepening toward its center.

(*b*) The depth and width of the rest preparation should be such as to provide an adequate bulk of metal in all occluding relations.

(*c*) All angles and surfaces must be rounded.

(7) Cingulum rest form:

(*a*) The cingulum rest is the one of choice on maxillary anterior teeth when occlusion, tooth bulk, and space permit. It is used most advantageously on maxillary cuspids.

(*b*) The preparation should follow the outline of the cingulum and the floor should be slightly inclined toward the center of the tooth.

(*c*) A tooth with an inadequate cingulum may require the construction of a crown, onlay, or resin bonded onlay into which the cingulum rest is prepared.

(*d*) If a lingual rest is desired on a mandibular anterior tooth or when the occlusion does not permit a cingulum rest on a maxillary anterior tooth, a lingual shoulder may be prepared in the enamel at or below the cingulum. These preparations should be rounded and smooth.

(8) Every tooth surface that has been modified must be polished.

(9) Teeth with short clinical crowns may require periodontal surgery to expose more surface for the proper placement of minor connectors, rests, or clasp arms.

3–3. The dental casts

a. Pouring the cast. When the impression is removed from the mouth it should be immediately rinsed with a thin slurry of artificial stone to remove saliva and mucous, and then disinfected. The disinfected impression is then poured immediately in artificial stone using the manufacturer's recommended water-powder ratio. When it is impractical to box an impression the initial pour of stone should cover the peripheral roll. Inverting the impression or placing it on the work bench while the stone is setting can cause a distortion. The tray should be supported in a horizontal position by its handle only. (See fig 3–1.)

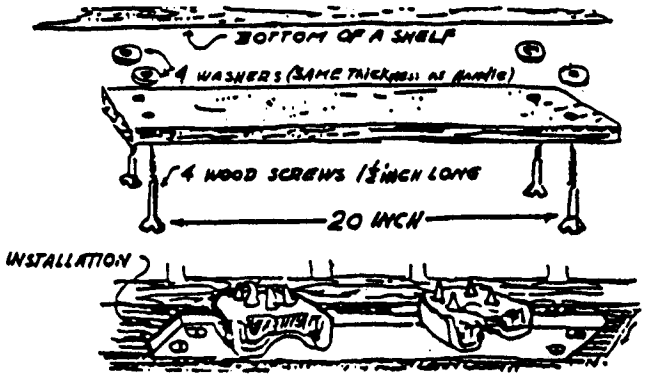


Figure 3–1. Impression tray holder.

Rough nodules should be built-up on the surface of the initial pour to engage and retain the base portion, which will be poured as a second stage. (See fig 3-2.) After the first pouring has reached its initial set, the impression may be inverted or boxed in order to complete the base.

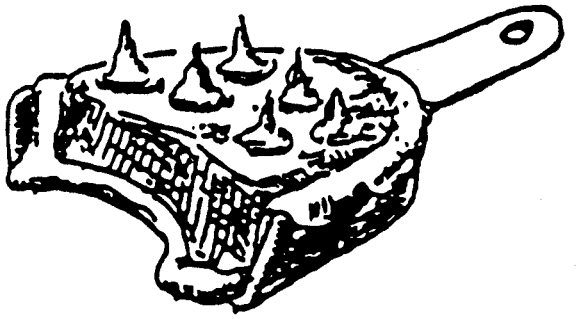


Figure 3-2. Initial pour.

All casts submitted for the construction of RPDs must exhibit the following (see figs 3-3 and 3-4):

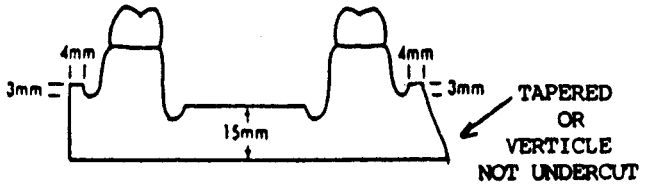


Figure 3-3. Mandibular cast dimensions.

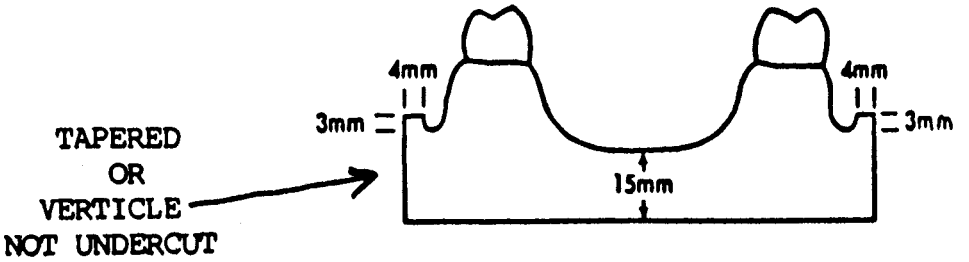


Figure 3-4. Maxillary cast dimensions.

b. Requirements for casts.

(1) Casts must be accurate, neatly trimed, dense, have a hard surface, and be free of voids and blebs. Correcton of minor defects in noncritical areas is the responsibility of the clinician. The occlusal surfaces must be free of imperfections. Defects in critical locations require a new cast. Hand-carving of casts is not acceptable.

(2) Casts must be properly extended to include all areas necessary for denture support. Maxillary casts must indicate a definite posterior border for the prosthesis and display the hamular notches as well as both tuberosities. Mandibular casts must include both retromolar pads.

(3) The base of maxillary casts at the deepest part of the palate must be 15 mm thick. The lingual area of mandibular casts must also be 15 mm thick and be trimmed flat and smooth, yet maintain and preserve the lingual peripheral roll.

(4) The peripheral roll must not exceed 3 mm in depth. It must be fully preserved and protected by a land or edge extending outward 4 mm from the roll.

(5) The side-walls of the base of casts for RPDs must taper outward toward the base to facilitate removal of the cast from the duplicating material. Figures should be utilized as a matrix for sizing and trimming of the master cast to a typical duplication flask utilized by the servicing ADL.

(6) If casts must be wet for any reason, a slurry of set artificial stone should be used. Tap water will leach the surface of casts.

(7) If a posterior palatal seal for a complete maxillary denture or extensive partial denture is not included in the impression technique, the clinician must modify the cast by scraping its surface to effect a posterior seal. This seal should be approximately 1½ mm thick at its greatest depth; this is a clinical, not a laboratory, procedure.

(8) If a denture is to be constructed to provide a relief for sensitive areas, bony prominences, etc., the dental officer must outline, in green, the areas to be relieved on the cast and describe the depth of relief desired.

(9) If the casts are mounted on an articulator prior to submission to an ADL, the base of the casts must be keyed and lubricated in the key area to permit accurate remounting of the casts. These casts must be removed from the articulator prior to submission to the ADL. The articulator must be sent with the casts since mounted casts are often not transferable from one articulator to another.

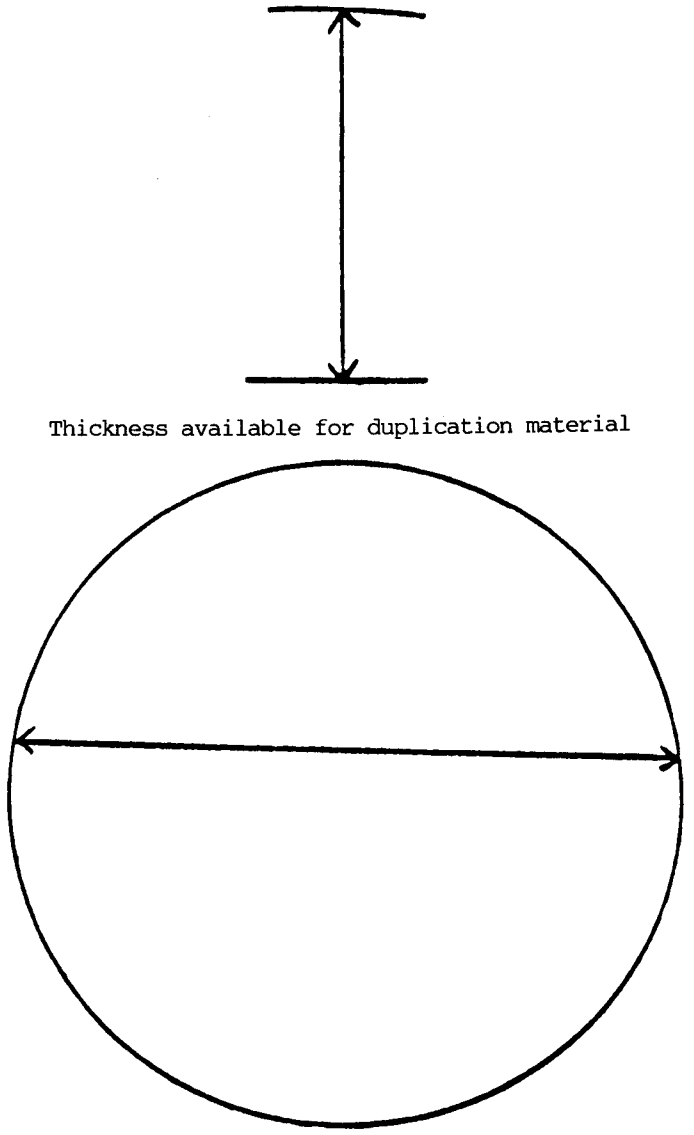
(10) The submitting dental officer must critically evaluate and approve the casts and all records prior to delegating the work to a dental laboratory specialist. The DD Form 2322 must be countersigned by the reviewing officer as designated by the DENTAC commander.

3-4. Intermaxillary records

a. Complete dentures. Any technique which provides accurate jaw relationship records may be used. The technique must employ a rigid, stable record base and occlusion rim. The record base may be stablized with rubber base or zinc-oxide impression material, etc., to improve its fit and stability. The occlusion rim may be sealed to the base with sticky wax. The occlusal surface or the maxillary rim must be formed to establish the plane to which the dentist desires the teeth to be set. The facial surfaces of the occlusion rim would be contoured to indicate the desired positions of the artificial teeth and have the mid-line marked. The rims and records must be indexed to permit positive reassembly at the laboratory. To prevent soft tissue displacement, interocclusal records should be made in a material that is "dead soft" while the relations are recorded. The material must become rigid upon setting, and not distort when separated, packed, or shipped.

b. RPDs. In general, the procedures for recording jaw relationships for RPDs are similar to those described above for complete dentures. If the casts can be related to each other in accurate centric occlusion by means of the remaining teeth, vertical connecting lines (orientation marks) may be drawn across the facial surfaces of occluding teeth at widely separated points. When this procedure is not possible, record bases with occlusion rims or well-trimmed plaster or elastomeric records may be used. Opposing teeth must not contact the opposite ridge nor should they penetrate the recording media to contact the hard portion of the occlusion rim or the record base. If the clinician wishes to exclude the opposing cast or occlusal record, the ADL will attempt to properly place and contour the components of the framework; however, occlusal equilibration will then be the clinician's responsibility. "Mush bites" and "sandwich bites" for packaging and mailing are not acceptable. After the casts have been related to each other with the registration, this relationship should be checked clinically against the patient's natural occlusion. In order to make this comparison, it is necessary to trim the registration so that only the indentations of the tips of the opposing cusps remain. Registrations must not be sealed to each other or to the casts. Approximated casts sealed in this manner very often are broken during shipment. With respect to the dimension of a typical duplication flask, larger flasks are available. However, experience has demonstrated greater consistency of correct framework adaptation to master casts when the typical size flask is utilized. (See fig. 3-5.)

c. Esthetic guidance. Whenever anterior teeth are to be replaced, the clinician and patient should agree on the desired results. In order to aid the ADL in achieving this end, the following should be effective in communicating a legally binding prescription:



Dimension of typical duplication flask. Larger flasks are available; however, experience has demonstrated greater consistency of correct frame work adaptation to master casts when this size of flask is utilized.

Figure 3-5. Typical duplication flask.

(1) A cast of an existing fixed, RPD, or temporary fixed prosthesis with acceptable esthetics will allow the ADL to establish the desired contours, vertical and horizontal overlap.

(2) Select and set denture teeth on a wax rim to acceptable results. Make an impression and pour a cast of the required contours, vertical and horizontal overlap.

(3) RPDs replacing anterior teeth can be enhanced by providing the ADL with the anterior teeth already set in the desired positions. An anterior plaster matrix should be made for the setup plus one adjacent tooth on each side of the edentulous area. The ADL will be able to cast to these replacement teeth and provide internal metal reinforcement that will greatly enhance both strength and esthetics.

3-5. Fixed partial dentures, crowns, and dies

To assist ADLs in fabricating the requested replacement, these procedures must be followed.

a. All master and opposing casts must be poured in improved stone. Opposing casts must be included in all instances.

b. Full arch casts are required for all fixed partial dentures.

c. Dies must be fabricated of die stone or metal. Any undesirable undercuts must be blocked out by the submitting clinician.

d. When separating the die from the cast, as much of the endentulous ridge as possible must be kept intact. This facilitates the proximal contouring of restorations in relation to the edentulous ridge and gingival sulcus of the abutment tooth.

e. To ensure accurate seating without rotation, dies must be constructed with dowel pins and indexed.

f. To facilitate removal of dies, the dowel pins should be parallel to each other and their apices exposed through the base of the cast and the articulator mounting.

g. Each die must have definite margins; the die must be accurately trimmed to the gingival margins and the margins lightly outlined with nonindelible colored pencil.

h. Dies for porcelain jacket crowns must have a 2 to 3 mm parallel root surface below the margin to facilitate the adaptation and removal of the platinum matrix without distortion.

i. Occlusal registrations must provide accurate articulation. Registrations must be stable enough to withstand shipment. Stone straps are the preferred technique as durable occlusal registrations.

j. Wax patterns must be invested prior to sending them to an ADL for casting. A notation as to the amount and type of metal required for casting must be included. The submission of wax patterns is not encouraged and should only be used in an emergency situation.

k. The prescription should provide the technician with specific instructions as to type and position of crowns and pontics. Diagnostic casts and sketches are helpful supplements to the prescription for extensive anterior restorations. Esthetic guides such as a diagnostic cast with neatly set denture of the desired shape, contour, and positioning facilitates the laboratory technician's task and assures predictable esthetic results.

l. Shade selection for fixed ceramometal restorations will be made from current standard shade guides commercially available from the appropriate manufacturer (VITA, Bioform extended range, etc.). Do not utilize a resin shade guide (Bioblend) for requesting porcelain.

m. If the clinician desires the use of a die spacer or sealer (cyanoacrylate), it is to be placed prior to sending it to an ADL.

n. Casts for fixed partial dentures or individual crowns that require surveying must be tripoded by the clinician to provide the path of insertion. A DD Form 2322 with the design of the future partial should be included with the case submission.

3-6. Communication

a. Shipment preparation. Prior to sending the cast to an ADL, the following must be done:

(1) Indicate the limit of the posterior extension of the maxillary appliance by a sharp, black pencil line drawn across the palate. (DO NOT USE INDELIBLE PENCIL.)

(2) On the mandibular cast, mark the limit of the lower border of the major connector with a sharp, black pencil line. (DO NOT USE INDELIBLE PENCIL.)

(3) All dentists are strongly encouraged to draw their RPD design to scale on a duplicate of the master cast utilizing the following color codes:

(*a*) *RED*=METAL.

(*b*) *GREEN*=RELIEF.

(*c*) *BLUE*=RESIN, PORCELAIN, AND/OR WROUGHT WIRE.

(4) With prior approval from the servicing ADL commander, the clinician may draw the major connector on the master cast and bead the master cast with a no. 2 round bur; detail it with a spoon excavator, reshaped to the contour of the no. 2 bur.

b. Rotational path type RPDs. There is a difference between a dual path RPD and a rotational path RPD. A dual path RPD is one in which there is a combination slide and rotation path of insertion and a rotational path RPD is one in which there is only a rotational path of insertion. To construct rotational path type RPDs, the ADL must receive a completed DD Form 2322 with all pertinent comments and the following:

(1) Dual path RPD. A master cast with two sets of tripod marks drawn on the cast. The first set of tripod marks should be circled with a red wax pencil and indicate the initial and conventional survey of the cast. The second set of tripod marks should be circled with a blue wax pencil. These tripod marks indicate the tilt of the cast to be used when blocking out the area of the master cast to receive the rigid retentive portion of the RPD.

(2) The following considerations should be kept in mind when contemplating a dual path type RPD:

(*a*) Occasionally a clinician will state on the DD Form 2322, "do not blockout the mesial of no. 6 and no. 11, make a dual path RPD." When evaluating the area of the cast to receive the rigid retention, unless all undercut can be eliminated when tilting the cast back, blockout will be necessary in that area.

(*b*) Bead retention is not indicated in the anterior edentulous area.

(*c*) A patient with a high or deep palatal vault may be unable to rotate the RPD into final resting position.

(*d*) The conventional clasps used on posterior teeth should have the clasp tips pointed towards the distal, not towards the mesial.

(*e*) The rotational type RPD should be limited to totally tooth borne cases.

(*f*) This type RPD is best used on Kennedy Class IV patients. Modification spaces will, on many occasions, present severe esthetic compromises.

(*g*) Lingual plating is contraindicated.

(3) Rotational path RPD. A master cast with one set of tripod marks. The clinician should evaluate critical undercuts and make whatever adjustments are necessary so the ADL does not have to block out in the area of rigid retention.

(4) The following considerations should be kept in mind when contemplating a rotational type RPD:

(*a*) I-bar retention is contraindicated. The body of these type clasps will invariably interfere with the rotation of the RPD into the final resting position.

(*b*) Lingual plating is contraindicated.

(*c*) Lingually tipped teeth in the path of rotation is a contraindication.

(*d*) The conventional clasps should have their tips pointed away from the rotation of the RPD.

(*e*) The rotational type RPD should be limited to totally tooth borne cases.

(*f*) Long "channel" type asymmetrical rests about 2 mm deep should be used on the teeth that will receive the rigid retention.

3–7. Artificial teeth

Activities not authorized to utilize indefinite quantity contracts may, when necessary, obtain teeth from ADLs for individual cases. These requests will be made by properly documenting DD Form 2322. (See para 2–2.) Requests must indicate manufacturer, mold, and shade. In selecting the shade, the shade guide specified by the manufacturer must be used for the particular tooth desired. The ADL can be contacted to determine stockage to facilitate the selection process.

3–8. Immediate dentures

To construct immediate dentures, an ADL must receive the following, in addition to the master casts and the jaw relation records:

a. A duplicate cast of the anterior portion of each arch for which multiple anterior teeth are to be replaced.

b. Specific instructions either to duplicate or modify the existing tooth form or arrangement.

c. Requests for surgical templates if they are desired.

d. Identification of the teeth to be extracted with a red "X" on both the cast and the prescription from when an immediate removable partial denture is to be constructed.

CHAPTER 4
MISCELLANEOUS ACTIONS

4-1. Discrepancies

Some of the more frequent discrepancies observed in cases submitted to dental laboratories are—

a. Operative dentistry not completed.

b. Distortion of tissues due to direct tray pressure.

c. Inadequate preparation of rest seats and guiding planes for removable partial dentures.

d. Insufficient interridge distance for artificial teeth and denture bases. Insufficient clearance for occlusal, incisal, and cingulum rests.

e. Improperly trimmed or underextended casts.

f. Casts showing evidence of—

(1) Calculus deposits or debris on the teeth.

(2) Distortions due to either the premature removal of the impression or impression material sticking to the teeth.

(3) Hand carving to correct defective tooth or tissue contours.

(4) Voids, blebs, and rough, porous, or chalky surfaces.

(5) Talcum, dirt, vaseline, slurry, etc.

g. Unstable record bases and improper occlusal registrations.

h. RPD designs drawn on master casts without authorization.

i. Failure to remove undercuts from the denture before making an impression for rebase or reline.

j. Broken and distorted occlusal registrations resulting from poor packing.

k. Fixed prosthodontics.

(1) Excessively tapered tooth preparations or underprepared teeth.

(2) Dies with margins that are rough, obscure, or not outlined.

(3) Dies that are rough, not properly trimmed, or with no positive seat.

(4) Inaccurate occlusal records.

(5) Failure to provide full arch casts for posterior fixed partial dentures.

(6) Failure to provide casts of adequate extension for anterior crowns and fixed partial dentures.

(7) Improper tooth preparation for the type of restoration requested.

(8) Lack of adequate esthetic guidance.

(9) Inappropriate margin preparation for procedure requesting; that is, beveled margin for collarless restoration.

4-2. Other requests

a. Requests for all miscellaneous prostheses, such as mouth protectors, periodontal splints, and surgical splints, must be given the same careful attention as that accorded any other dental prostheses. Requests will include accurate casts, treatment plan, diagram of the design, and the desired materials. In many instances, occlusal registration records and a description of the overall treatment plan are necessary.

b. To repair fractured dentures, positive repositioning of the parts is essential. Complete dentures often require a plaster or stone matrix to hold the parts in accurate relation. Partial denture repairs usually require a cast made from an impression with the denture accurately seated in the mouth. If the impression is made with the denture out of the mouth, the denture usually will not fit the cast. If teeth or clasps are to be added to dentures an opposing cast is necessary when occlusal relations are involved.

c. Before making the impression for relining or rebasing, all of the undercuts must be removed from the tissue surface of the denture base. This is to permit separation of the denture from the cast during the laboratory procedures.

d. The selection of dental casting alloys used for patient restorations will be based on properties relevant to a particular use of the material and cost containment. Dentists providing treatment may prescribe the type of alloy (generic) that will best fulfill the needs of individual patients. If one ADL cannot provide a restoration with an alloy (generic) that satisfies the dentists' request, the case will be transferred to an ADL with the capability of filling the prescription.

4-3. Packaging and mailing

a. All casts must be disinfected before packaging. A recommended procedure (Runnell's, R.R.) for master casts, bite rims, duralay indices, etc., is as follows: Prepare a Wescodyne solution (hard surface iodophor) solution in 1:213 dilution in distilled water. Spray the master casts, etc., with a liberal amount of Wescodyne to thoroughly wet all surfaces. Allow the sprayed surfaces to stand for

10 minutes then rinse them with a spray of supersaturated solution of calcium sulfate made with distilled water. Tap water may result in growth of organisms on the casts during shipment. A potential incubator effect during periods of high temperature may contribute to the growth. After being allowed to dry, the casts, bite rims, etc., must be wrapped in a plastic bag prior to placing them in the packing boxes.

b. Casts must be placed in the foam protector (NSN 6520-00-142-8727, Protector, Denture Model), back-to-back, and shipped in the standard mail carton (NSN 8115-00-511-5750, Box, Setup).

c. Occlusion rims should be placed on the casts.

d. Dies must be removed from the casts and packed separately (NSN 8115-00-844-6695, Box, Small Parts).

e. Occlusal indices must be wrapped separately.

f. Just prior to closing the box, the DD Form 2322 should be annotated "Contents sanitized/disinfected by _____ on _____."

g. The mailing box should be wrapped in postal wrapping paper and sealed with postal acceptable gummed tape. By not taping the mailing box directly, the service life of the mailing boxes is greatly extended.

h. DA Label 18 (Mailing Label), available through Army publications distribution channels, must be firmly affixed to the mailing box, and mailed to the appropriate ADL. The appropriate postage must be affixed to the mailing label as per local procedures. Current local mailing policies regarding metered mail must be followed.

i. It is recommended that each submitting facility maintain a mailing log to the ADL which identifies the case by name, clinician, type prosthesis, date mailed, and date delivered to patient. This will provide the command with an excellent history of prosthetic treatement as well as time requirements needed to accomplish the average prosthodontic case.

APPENDIX A
REFERENCES

A-1. Publication.

DA Pam 40-16	Dental Statistical Reporting.

A-2. Referenced

DA Label 18	Mailing Label.

A-3. Prescribed Form

DD Form 2322	Dental Laboratory Work Authorization.

APPENDIX B

LABORATORY VALUES AND CODES

Section I. COMPOSITE LABORATORY VALUES

Code		CLV
00001	Pour Cast, Preliminary, Master, Opposing or Remount	2
00002	Pour Cast, Fixed	4
00003	Box and Pour	5
00004	Impression Tray, Custom	4
00005	Pour Altered Case	5
00006	Articulation, Simple, Fixed or Removable	1
00007	Articulation, Semiadjustable, Fixed or Removable	2
00008	Articulation, Fully Adjustable, Fixed or Removable	2
00009	Soldering Procedures, Fixed or Removable	4
00010	Acrylic Resin Repairs and Modifications	5
00011	Repolishing	2
00012	Open	
00013	Open	
00014	Open	
00015	Fully Fabricated Fixed Partial Denture, Porcelain or Acrylic Resin Veneer	40
00016	Casting Only, Fixed Partial Denture, Porcelain or Acrylic Resin Veneer	22
00017	Veneer Only, Fixed Partial Denture, Porcelain or Acrylic Resin Veneer	18
00018	Fully Fabricated Fixed Partial Denture, All Metal, Unveneered	30
00019	Fully Fabricated Crown, Porcelain or Acrylic Resin Veneer	41
00020	Casting Only, Crown, Porcelain or Acrylic Resin Veneer	23
00021	Veneer Only, Crown, Porcelain or Acrylic Resin Veneer	18
00022	Fully Fabricated Crown, All Metal, Unveneered	31
00023	Inlays, Metal or Porcelain	12
00024	Porcelain or Acrylic Resin Jacket Crown	25
00025	Cast Post, Dowel, and Core	12
00026	Casting Only	2
00027	Surveyed Crown	2
00028	Precision Connector or Stress Breaker, Fixed Partial Denture	5
00029	Andrews Bridge	220
00030	Template, Provisional Fixed Partial Denture or Crown	2
00031	Provisional Fixed Partial Denture or Crown	3
00032	Characterized Veneer or Special Staining	2
00033	Glazing	2
00034	Open	
00035	Open	
00036	Record Base and Occlusion Rim, Partially Endentulous Casts	6
00037	Occlusal Relation Orientation Indexes	2
00038	Setup, RPD	12
00039	Processing of Bases, RPDs	12
00040	Remount and Equilibration of Processed Dentures	7
00041	Process Only, RPD or Complete Denture	8
00042	Fully Fabricated RPD	87
00043	Transitional RPD	18
00044	Wrought Clasps	2
00045	Casting Only, RPD, Surgical, Arch Bars and Metal Palates	55
00046	Positioning, Acrylic Resin Pontic or Tube Tooth	3
00047	Reinforced Acrylic Resin Pontic/Tube or Tooth, Attaching and Processing	4
00048	Precision Attachment, RPD	5
00049	Specialized Hinged Retainer, RPD	60
00050	Stress Breaker, RPD	25
00051	Bar Clip, Removable Denture	20
00052	Reline, Complete or RPD	15
00053	Rebase, Complete or RPD	20
00054	Open	
00055	Open	

Section I. COMPOSITE LABORATORY VALUES—Continued

Code		CLV
00056	Record Base and Occulusion Rim, Complete Denture	5
00057	Setup, Complete Denture	18
00058	Final Waxup, Complete	3
00059	Characterized Denture Base, Complete or Removable	3
00060	Process Only, Complete Denture	8
00061	Finish and Polish, Complete Denture	8
00062	Fully Fabricated Complete Denture	37
00063	Duplicate or Transitional, Complete Denture	20
00064	Open	
00065	Open	
00066	Orthodontic Study Models	8
00067	Diagnostic Setup or Waxup	20
00068	Orthodontic Tooth Positioner	40
00069	Hawley Appliance, Simple	15
00070	Removable Orthodontic Expansion Appliance	15
00071	Modification Attachments for Hawley and Expansion Appliances	2
00072	Soldered Appliance, Simple, Fixed	18
00073	Soldered Appliance, Complex, Fixed	24
00074	Basic Orthopedic Appliance	20
00075	Functional Orthopedic Appliances	31
00076	Open	
00077	Open	
00078	Open	
00079	Open	
00080	Cast, Maxillofacial, Complex or Sectional	8
00081	Sculpture of Prosthesis, Maxillofacial	30
00082	Fabrication of Stone Mold, Maxillofacial	10
00083	Fabrication of Metal Mold, Maxillofacial	15
00084	Processing Prosthesis, Extra Oral	20
00085	Casting Complex Metal, Maxillofacial	80
00086	Processing, Acrylic Resin Complex, Maxillofacial	22
00087	Radiation Carriers, Shields and Docking Devices	15
00088	Oral Orthotic Devices	20
00089	Custom Occular Prosthesis	80
00090	Open	
00091	Open	
00092	Open	
00093	Mouthguard, Flexible, Athletic or Fluoride Carrier	4
00094	Acrylic Resin Model, Demonstration, Education	15
00095	Special Projects (Maryland Bridge Etch 2 CLV)	Time unit*
00096	Issue Prosthodontic Teeth	1
00097	Open	
00098	Open	
00099	Open	

Section II. DENTAL MATERIALS CODES

Material No.	Material
0	Open/nonmaterial code.
1	Resin.
2	Porcelain-Nonporcelain Alloy.
3	Regular Gold (I–IV) Nonp. Alloy + Resin.
4	White Ceramic Gold.
5	Yellow Ceramic Gold.
6	Combination Metal.
7	Nonprecious Metal.
8	Open.
9	Open.

*Credit one CLV for each 6 minutes of actual, hands-on fabrication time. If a project takes 1 hour, take credit for 10 CLVs.

GLOSSARY

ADL	area dental laboratory.
CLV	composite laboratory value.
DENTAC	dental activity.
DOD	Department of Defense.
M-Day	Mobilization Day.
mm	millimeter.
PCS	permanent change of station.
RPD	removable partial denture.
USAADL	U.S. Army area dental laboratory.

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