

A Technique for Registration and Reorientation of Surveyed Dental Casts

Case Report

Majid Abolhasani¹, Amirhosein Shakibamehr², Hamid Neshandar Asli³,

¹ Assistant Professor, Dental Implants Research Center, Department Of Prosthodontics, School Of Dentistry, Isfahan University Of Medical Sciences, Isfahan, Iran.

² Assistant Professor, Department of Prosthodontics, School of Dentistry, Qazvin University of Medical Sciences, Qazvin, Iran.

³ Associate Professor, Department of Prosthodontics, School of Dentistry, Guilan University of Medical Sciences, Guilan, Iran.

Received: 18 Aug 2014

Accepted: 9 Oct 2014

Corresponding Author:

Amir Hossein Shakibamehr

Address: Department of Prosthodontics, School of Dentistry, Qazvin University of Medical Sciences, Qazvin, Iran.

Telephone: +98 9125614972

Email: dr.shakibamehr@gmail.com

Abstract

Precise registering and transferring of the selected path of insertion and withdrawal of removable, partial dentures is a critical step in designing and fabricating their framework and determining the retention, stability, and support of the completed prosthesis. Many authors have addressed this issue in their studies. In this study we present a new technique for registering and reproducing partial edentulous cast orientation by the use of a laser level.

Key words:

•Denture •Partial •Removable •Dental Prosthesis Retention •Lasers

Case Report

Understanding the biomechanics and principles of engineering plays a significant role in designing a removable partial denture (RPD). A fundamental step in designing and fabricating an RPD is to choose an appropriate spatial orientation for the casts, which determines the path of insertion and withdrawal of the prosthesis.^(1, 2,3) It is achieved through a surveying process by the use of a dental surveyor. The path is selected by considering factors such as parallel guide plans, esthetics, interferences, and retention.⁽³⁾ The precise selecting and preserving of the proper cast orientation will ensure the quality of the fabricated prosthesis.⁽⁴⁾ These include surveying the study and working casts, contouring the wax patterns, precise positioning of the prefabricated extracoronar attachments, and precision milling of the surveyed crown.⁽⁵⁾ The cast orientation should be registered and reproducible for future procedures. The conventional process for registering and duplicating the cast orientation is the tripodding method, in which three widely spaced points are marked on the cast in the same vertical height perpendicular to the analyzing rod, which creates a virtual horizontal plane.^(3,5) Creation of these marks is simple and easy, but reproduction of that horizontal plane is somewhat difficult and time consuming. Another method is to mark vertical lines on sides of the cast.⁶ However, the walls of the cast should be trimmed parallel to the analyzing rod. Several other methods have been introduced by the authors for facilitating the registration of the cast orientation.⁽⁷⁻¹⁴⁾

In this study, we present a method to register the spatial position of the partial edentulous cast with the aid of a laser level.

Discussion

In this technical report we described the use of a laser level for tripodding.

The procedure

Two straight lines are drawn with favorite angles {1.2 [EN] Meaning unclear} by a pencil on the lateral and back walls of the cast. The color should have contrast to red light (Figure 1). The most appropriate path of insertion and removal will be determined (Figure 2a and 2b). The laser level (laser meter, Fardox corp, Shenzhen, China) (Figure 3) is turned on in front of the lateral

wall of the surveyor table. It projects a linear red light and its head is rotatable and the angle of the line can change from 0 to 90 degrees. The head of the device is turned so that the projected laser line is aligned to the line drawn on the cast, and the angle created by the laser level head is recorded (Figure 4). The steps 3 and 4 are repeated for the posterior wall of the cast. The two measured angles are saved for future use. For reorientation of the cast, the upper steps are performed in reverse. The laser level is turned on, and its head is rotated to create the previously saved angle. The surveyor table is unlocked, and the cast is tilted anteroposterior to match the drawn line on the lateral wall to the created laser line. The above stages are repeated for the posterior wall of the cast.

Sometimes, while adjusting a cast orientation in one plane, the other orientation may change. For avoiding such problems, the alignment of the laser line is kept along the first adjusted line, and the tilt of the cast is changed simultaneously in the other plane.



Figure 1. The laser level used for the measurement of the inclinations



Figure 2. Two straight lines are marked on the lateral walls of the cast with a pencil (a, left photo; b, right photo).

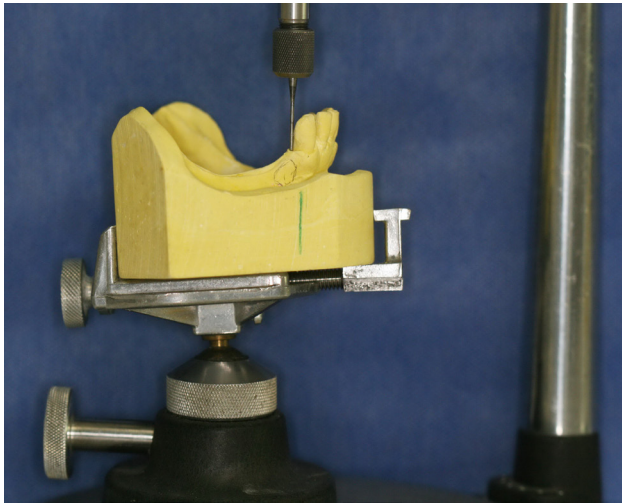


Figure 3. The most appropriate path of insertion is determined

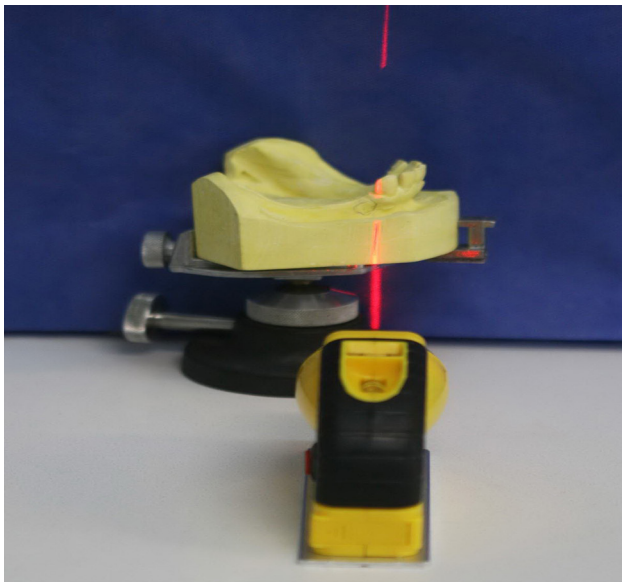


Figure 4. The laser line is projected on the marked line of the lateral wall.

Conclusion

When a dentist surveys a partially edentulous cast, he/she should determine the tilt of the cast to be used to take advantage of guide planes, to avoid or place undesirable undercuts appropriately, and for proper functioning of the selected clasp system.³ In this study we described a method for registering the cast orientation and its reproduction.

Without this registration, laboratory technicians cannot precisely duplicate the tilt that the dentist has determined.¹⁵ Inaccurate reorientation can influence the proper placement of the block-out wax and may result in inaccurate placement of direct retainers into desirable undercuts and improper contacts of minor connectors with guiding planes. The presented technique is simple and time saving in relation to the conventional tripod method for both the dentist and the technician, because in the presented method the cast orientation is adjusted in only two plans. However, performing this technique requires extra devices and may not be economic.

References

1. Bezzon OL, Mattos MG, Ribeiro RF. Surveying removable partial dentures: the importance of guiding planes and path of insertion for stability. *J Prosthet Dent* 1997; 78(4):412-8.
2. Hanson JG, Axinn S, Kopp EN. Surveying. *J Am Dent Assoc* 1975; 91(4):826-8.
3. Carr AB, McGivney GP, Brown DT, McCracken WL. *McCracken's removable partial prosthodontics*. 12th ed. St. Louis: Mosby; 2010.
4. Bowley JF, Cipra DL, Herman PF. Evaluation of the accuracy of cast reorientation to a surveyor by prosthodontic residents. *J Prosthet Dent* 1992; 68(2):294-8.
5. Lovely M. *Review of Removable Partial Dentures*. India: Jaypee Brothers Publishers; 2005.
6. Wagner AG, Forgue EG. A study of four methods of recording the path of insertion of removable partial dentures. *J Prosthet Dent* 1976; 35(3):267-72.
7. Bezzon OL, Ribeiro RF, Pagnano VO. Device for recording the path of insertion for removable partial dentures. *J Prosthet Dent* 2000; 84(2):136-8.
8. Steas AD. Recording and reproducing the tilt of a cast on a surveyor. *J Prosthet Dent* 1987; 57(1):121-5.
9. Kamble VD, Parkhedkar RD, Bhowmik H. A magnetic device for recording and reproducing the path of placement for partial removable dental prostheses. *J Prosthet Dent* 2013; 110(4):333-4.
10. Wagner AG, Forgue EG. A study of four methods of recording the path of insertion of removable partial dentures. *J Prosthet Dent* 1976; 35(3):267-72.
11. Shakibamehr AH, Askari N, Abolhasani M, et al. A procedure for recording and reproducing the cast position on a surveyor. *Dent Res J (Isfahan)* 2013; 10(5):695-6.

A Technique for Registration and Reorientation of Surveyed Dental Cast

12. Knapp JG, Shotwell JL, Kotowicz WE. Technique for recording dental cast-surveyor relations. *J Prosthet Dent* 1979; 41(3):352-4.
13. Ansari IH. A procedure for reorienting a cast on a surveyor. *J Prosthet Dent* 1994; 72(1):104-7.
14. von Krammer R. accurately positioning a duplicate cast on the surveying table. *J Prosthet Dent* 1989 Mar;61(3):378-80.
15. Rudd RW, Rudd KD. A review of 243 errors possible during the fabrication of a removable partial denture: Part II. *J Prosthet Dent* 2001 Sep;86(3):262-76.