

# A Technique for Registration and Reorientation of Surveyed Dental Casts

## ***Case Report***

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## **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.<sup>(1, 2,3)</sup> 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.<sup>(3)</sup> The precise selecting and preserving of the proper cast orientation will ensure the quality of the fabricated prosthesis.<sup>(4)</sup> These include surveying the study and working casts, contouring the wax patterns, precise positioning of the prefabricated extracoronal attachments, and precision milling of the surveyed crown.<sup>(5)</sup> The cast orientation should be registered and reproducible for future procedures. The conventional process for registering and duplicating the cast orientation is the tripod 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.<sup>(3,5)</sup> 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.<sup>6</sup> 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.<sup>(7-14)</sup>

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.

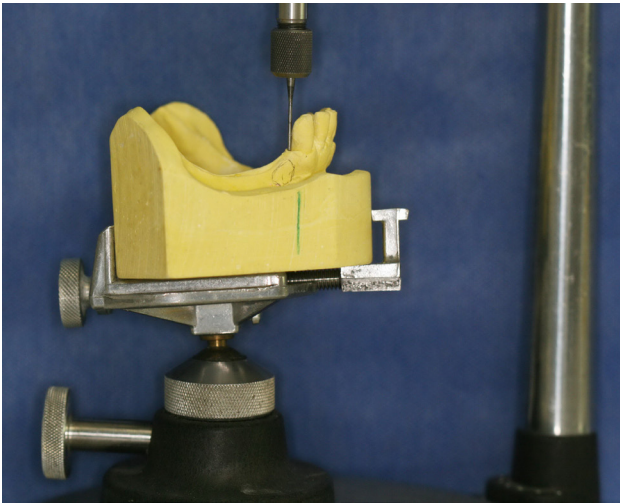
Sometimes, while adjusting a cast orientation in one plane, the other orientation may change. For avoiding such problems, the alignment of the laser line is kept along the first adjusted line, and the tilt of the cast is changed simultaneously in the other plane.



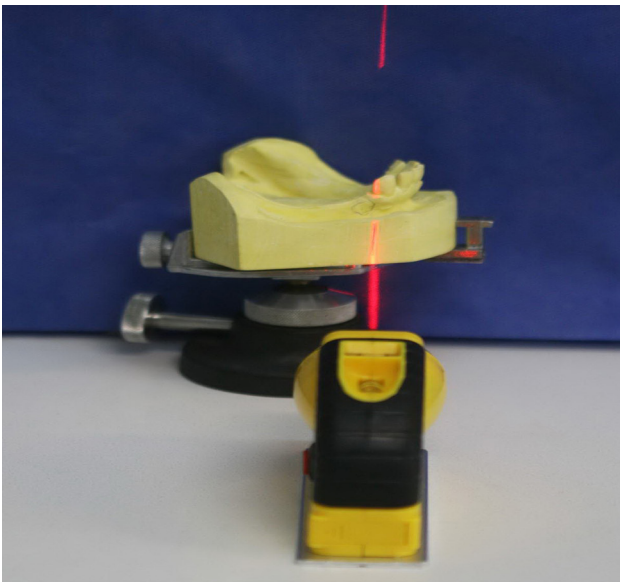
**Figure 1.** The laser level used for the measurement of the inclinations



**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.<sup>3</sup> 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.<sup>15</sup> 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.

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