An Easy Practical Way to Correctly Record Centric Relation

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INTRODUCTION

The precise location of centric relation has been a very important aspect in the practice to the success of many dentists.1-4 However, it is often difficult to record an accurate centric relation record, sometimes due to lack of neuromuscular relaxation and other times unskillful jaw manipulation. Many centric relation registration techniques have been introduced and advocated.1,5-10 Research has shown that when a patient closes on a narrow piece of wood, metal, or plastic between overlapping incisors, the mandibular condyles become positioned in the most superior position of the glenoid (articular) fossae.11,12 The leaf gauge was developed and introduced by Long in 1973.7 Its usefulness and value as an anterior deprogramming device has been recognized by many researchers, clinicians, and by the American Academy of Restorative Dentistry.13-19 Using the same philosophy, in 1985 Woelfel developed a system using a disposable leaf gauge and a thin mylar covered perforated Wafer for carrying the interocclusal registration media.11

The O.S.U. Woelfel Leaf Wafer has a perforated slot to hold the leaf gauge which serves as a handle (Fig. 1). In tests with a Veri-check (Denar Corp, Anaheim, CA) and Panadent Axi-path Recorder (Panadent Corp, Grand Terrace, CA), there was very good reproducibility between multiple centric relation records.10,19

The purpose of this article is to introduce a technique for recording centric relation utilizing the O.S.U. Woelfel Leaf Wafer.
Fig. 1. The Slot can serve as a handle.

Fig. 2. The Woelfel's Wafer.

Fig. 3. To tip the patient's head back in order to easily gain C.R. position.

Fig. 4. Put paper leaf gauge into the Slot.

Fig. 5. Insert Wafer-leaf gauge assembly into mouth.

Fig. 6. Mark mid-line and the buccal extent of upper central incisors.
MATERIALS AND METHOD

This new system, the O.S.U. Woelfel Leaf Wafer, uses a disposable paper leaf gauge (Fig. 2).

1. The first procedure is to determine the minimum thickness with a leaf gauge that is needed to barely separate (disclude) the posterior teeth (Fig. 3). The patient’s head is tipped back to stretch both supra- and infra-hyoid muscles when the incisors are closed firmly on the leaf gauge. The posterior teeth must remain separated for three to five minutes. This prolonged separation of the posterior teeth deprograms the habitual closing pattern of the masticatory muscles and allows for a neuromuscular repositioning of the structures in the craniomandibular joints. Once this occurs, the location and recording of centric relation on most patients is very easy.10,21

2. A wafer is selected. The leaf gauge is then removed from the mouth and put into the Wafer slot (Fig. 4). The Wafer-leaf gauge assembly is inserted into mouth the first time (Fig. 5). The mandible is guided during the closure into centric relation, and the patient is told to close firmly on the leaf gauge. Once again, verify the opening of posterior teeth by asking patients if any teeth except the incisors are touching. If the patient feels touching of posterior teeth, more pages of the leaf gauge shall be added until the opening of posterior teeth is assured.

3. Mark midline and the buccal extent of the maxillary incisors on the top side of the wafer (Fig. 6). Then remove paper leaf gauge and place wafer in the exact location where it was positioned by the leaf gauge. The wafer should be deformed by the maximum intercuspal closure in this location.

4. While wafer is being deformed by the maximum intercuspation closure, it is helpful to bend the edges of the wafer up and down several times (Fig. 7).
5. Remove the wafer and trim it with scissors if necessary (Fig. 8). Another piece of leaf gauge or a piece of gauze is inserted in the mouth when leaf gauge is removed from the mouth and while loading wafer for check-bite (Fig. 9).

6. The registration media is mixed and minimal amounts are spread over the tooth imprints on both sides of the wafer (Fig. 10).

7. The wafer with the leaf gauge in place is reinserted into the mouth using the previous landmark as a guide. The mandible is again guided upward during the centric relation closure until the mandibular incisors touch the tab on the inferior surface of the wafer (Fig. 11).

8. The wafer assembly is removed as soon as the registration
Fig. 12. Trim of excessive recording material leaving only the tips of indentation.

media is set. Excess check-bite material is trimmed off with a sharp knife or scissors leaving only the tips of tooth indentations (Fig. 12).

9. The centric relation record is now ready to be used for mounting of casts. Woelfel suggests leaving the leaf gauge in its correct position on the wafer for anterior stability when the casts are oriented and secured with sticky wax for mounting.

DISCUSSION

The advantages of the O.S.U. Woelfel Leaf Wafer technique are:

1. Economical, anatomically designed, accurate, easy to use, self-contained unit, readily adaptable to varied situations, mouths, and dentists' needs.

2. Wafers are made in three shapes, five thicknesses (two thinner than formulator mesh, blue 170μm, pink 100μm), and are easy to modify with scissors. Additional holes can be easily added with a 1/8 inch paper punch.

3. The disposable, narrow, firm, color-coded paper leaf gauges guide and hold the mandible naturally in centric relation at the desired minimal necessary vertical separation of the posterior teeth.

4. Elimination of sterilization delays, the commonly experienced bite frame interferences, use of fiber glass mesh, and gagging problems.

5. The mylar laminated surfaces of the wafer readily conforms to irregularities in the occlusal plane. The wafer compensates twice
for its own thickness anteriorly. The maxillary incisor closes on the wafer in front of the slot while the mandibular incisor closes onto the tab posterior to the slot. Therefore the actual thickness of the check-bite is the leaf gauge thickness plus two times the wafer thickness. The wafer floats freely between the minimally separated opposing cusps during the check-bite procedure.

6. Duplicated centric relation check-bites are easily made by using exactly the same type of wafer and thickness of leaf gauge. Color-coding is useful at this moment.

7. Lateral and protrusive check-bite can be made with the wafer without a leaf gauge. The wafer is custom indented at the desired jaw position, thus showing exactly where to load the check-bite media and where to have the jaw during the registration.

8. Additional stability during mounting casts is achieved by leaving paper leaf gauge in the wafer assembly.

9. The disposable leaf gauge can be given to patients to close periodically for short periods of time as instructed to possibly alleviate craniomandibular joint pain dysfunction symptoms which are frequently caused by spasms of the superior heads of the lateral pterygoid muscles.

10. The color-coded varied thickness leaf gauge facilitates wider use of this valuable diagnostic aid for patient records during restoration and orthodontic treatment as well as for adjustment of minor centric relation prematurities.

The reproducibility of centric relation record made with the O.S.U. Woelfel Leaf Wafer has been checked with a split-cast-self-kleen Mounting System (Panadent Corp, Grand Terrace, CA) and Axi-path Recorder (Panadent Corp, Grand Terrace, CA).

Twenty-seven non-symptomatic dental students were used. Three centric relation records were made with this system. One record was used to verify the mounting, and the transverse horizontal axis were marked on the graph paper with Axis-position Indicator (Panadent Corp, Grand Terrace, CA). At least two of the centric relation records were found to be identical for each of the twenty seven subjects.

Reproducibility is one way to verify centric relation records and mountings. As determined by this study, the O.S.U. Woelfel Leaf Wafer is a very dependable system for use, especially when three centric relation records have been made for each patient.
MATERIALS OF CHOICE

Polyether is Woelfel’s first choice as the registration media. Polyvinyl siloxane (Blue-Mousse and Regisil, Dentsply, York, PA) as his second choice for convenience. Zinc Oxide Eugenol paste (Superbite, Bosworth Co, Skokie, Ill.) was the third choice. A polyether tray adhesive should be used over the tooth imprints when ZOE paste is used. We have tried 14 different kinds of adhesive and the polyether tray adhesive (Fig. 13) was the only one that was effective in holding the set brittle zinc-oxide eugenol paste to the wafer surface.

SUMMARY

The centric relation recording procedure is the most important task in restorative dentistry. The O.S.U. Woelfel Leaf Wafer System provides an easy and practical way to accurately record this position. The reproducibility was very good, and the paper leaf gauge and wafer assured a minimal increase in vertical dimension for centric relation records. This system seems to reduce the amount of mounting error. The method is economical, easy to learn to use correctly, provides very good reproducibility, avoids dentist manipulation of the mandible, and is quick and very easy for the patients. This technique can be effectively adapted for routine restorative use.

REFERENCES


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