

## Occlusal rehabilitation of posterior fixed prostheses: A clinical report

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Masticatory function is more important than esthetics in posterior fixed restoration. The usual technique—mounting the casts on a semi-adjustable articulator, etc.—cannot make all patients satisfied with their restorations. For example, functionally generated path technique can be an easier and more satisfactory method in the restoration of group function. These clinical reports describe various approaches for occlusal restoration of relatively simple posterior fixed prostheses according to patients' occlusal patterns.

The 3-unit bridge restoration is one of the most popular treatment options in prosthodontics. Because dentists have much experiences of it, they restore a missing span of one tooth mechanically, that is, without special consideration. While esthetics is important in making an anterior 3-unit fixed prostheses, mastication is more focused on in posterior 3-unit bridge restoration. Many dentists are concerned about various aspects in esthetics, such as morphology of the tooth, value, chroma, hue, translucency, surface texture, etc. But they do not usually consider various methods to restore occlusion. They treat one-tooth-missing area in a similar way in spite of patients having variety of occlusal patterns.

Three cases are presented here in 3 or 4-unit bridge restoration. They show some methods to restore patients' occlusal patterns.

### CLINICAL PROCEDURE

#### CASE 1: Conventional technique

A 32-year-old patient had chief complaint of restoring #46 missing area (Fig. 1). #46 had been extracted 8 weeks before impression-taking because of periodontal problems. #45 and #47 were generally prepared for the 3-unit bridge (Fig. 2) and full arch impression were taken. Centric relation and lateral (left and right) excursion

checkbites were obtained to mount the casts on the 3B class articulator (Hanau Modular, Teledyne Hanau, USA). Facebow-transfer was also done (Fig. 3). The stone models were mounted and 3-unit PFG fixed prostheses were made in the laboratory (Fig. 4). Occlusal equilibration was done intraorally and the restoration was permanently seated (Fig. 5). The patient was satisfied with masticatory function.

Patient's occlusal pattern was unilateral balanced occlusion in this case. The problem was that it was

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Fig. 1. Pre-treatment condition.

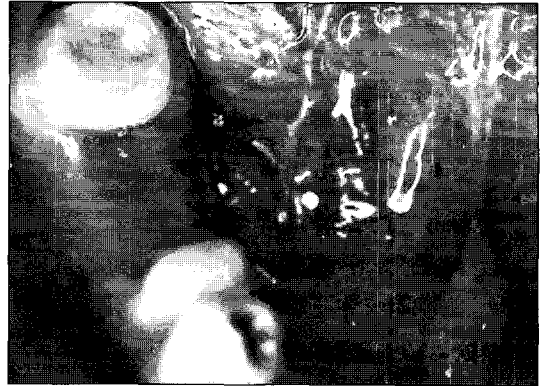


Fig. 2. Abutment teeth were prepared.

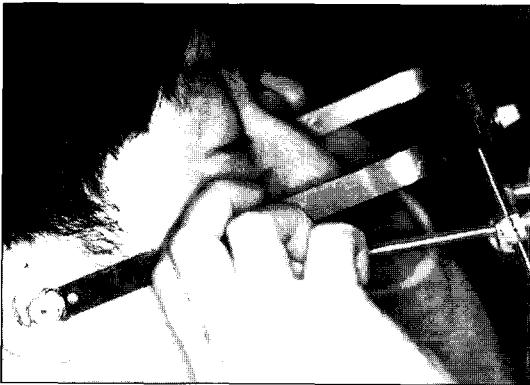


Fig. 3. Facebow-transfer.

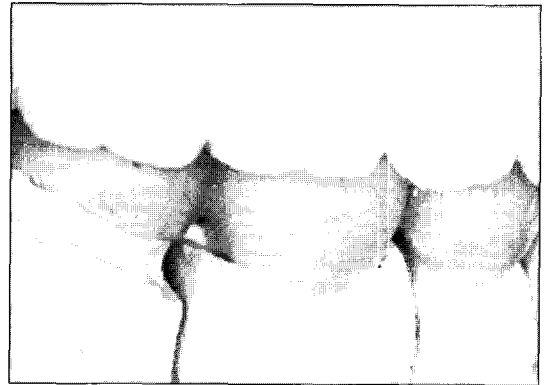


Fig. 4. Completed 3-unit PFG bridge.



Fig. 5. The 3-unit bridge was permanently seated.

considerably difficult to adjust occlusion to group function by using this general technique because the semi-adjustable articulator has the gnathologic

concept. This point was considered in the next cases.

#### **CASE 2: Functionally generated path technique<sup>10</sup>**

A 26-year-old female (Fig. 6) and a 43-year-old male (Fig. 7) wished that #15 missing area should be restored. #14, #16 and #17 had been already prepared before treatment began. Occlusal pattern on the left side was group function. So, functionally generated path technique (FGP technique) was decided to be used in these cases. #14, #16 and #17 were slightly more prepared and finished. Impressions were taken. Functional cores were obtained by using Duralay resin and impression plaster (Figs. 8, 9). Facebow-transfer was done in the female patient to analyze



Fig. 6. Pre-treatment condition, the female patient. Abutments have already been prepared.

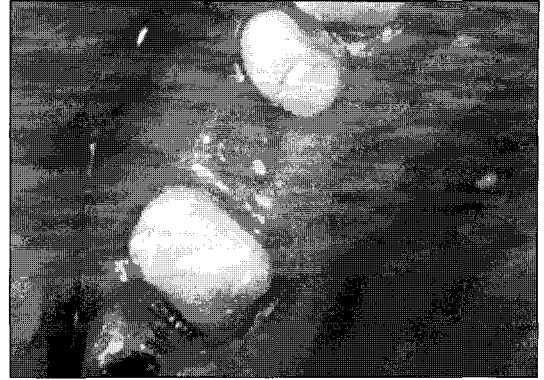


Fig. 7. Pre-treatment condition, the male patient. Abutments have already been prepared.



Fig. 8. Functional core, the female patient.

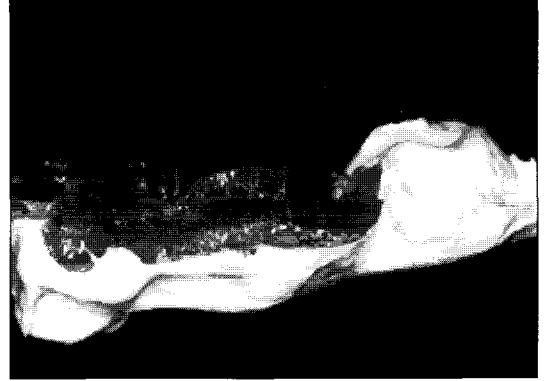


Fig. 9. Functional core, the male patient.



Fig. 10. Occlusal adjustment, the female patient. Carbon markings show that the lingual cusps have point contacts and the lingual inclines of the buccal cusps have surface contacts which mean group function.

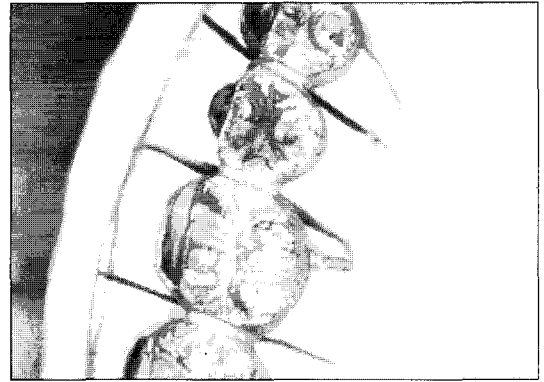


Fig. 11. Occlusal adjustment, the male patient.

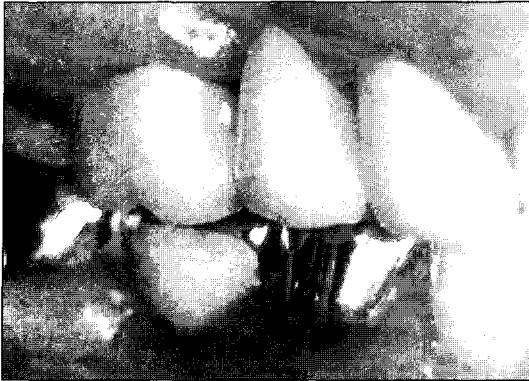


Fig. 12. Completed 4-unit PFG bridge in centric, the female patient.



Fig. 13. Completed 4-unit PFG bridge in lateral excursion, the female patient.



Fig. 14. Completed 4-unit PFG bridge in centric, the male patient.



Fig. 15. Completed 4-unit PFG bridge in lateral excursion, the male patient.

the occlusal plane. The casts were mounted on the semi-adjustable articulator (Hanau Modular, Teledyne Hanau, female patient, lateral and protrusive movement were not allowed) and the verticulator (Jelenko, USA, the male patient), respectively. 4-unit PFG bridges were made in the laboratory (Figs. 10, 11) and minimal occlusal equilibration were done intraorally. The restorations were permanently cemented (Figs. 12, 13, 14, 15). The patients were satisfied with mastication.

Group function mechanism was achieved more efficiently by using FGP technique.

### CASE 3: Pantographic tracing<sup>1-2,9</sup>

A 32-year-old presented with a chief complaint of restoration of #46 missing area after gantho-surgery. He had iatrogenically slight TMJ problem after surgery. His occlusal pattern was mutually protected occlusion. Considering these points, 3-unit PFG restoration was decided to be fabricated by using pantographic tracing. #45 and #47 were prepared (Fig. 16) and impression were taken. Then, the clutch was made and pantographic tracing was done (Fig. 17). The pantographic tracing was meaningful and reliable although the patient had TMJ problem because the tracing



Fig. 16. Prepared abutments.

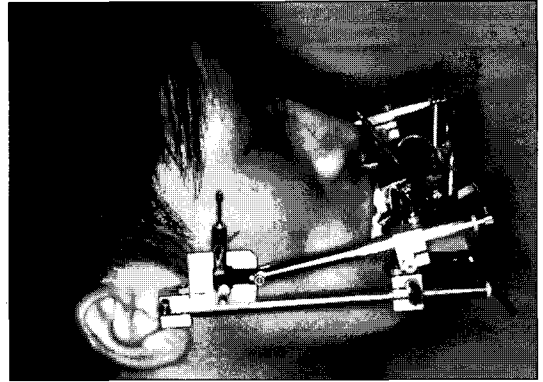


Fig. 17. Pantographic tracing.

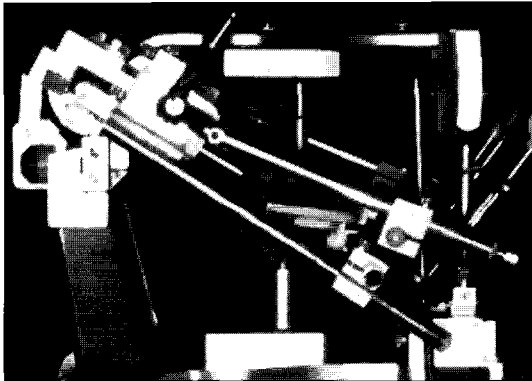


Fig. 18. The articulator (Denar D-5A) receives the pantograph.

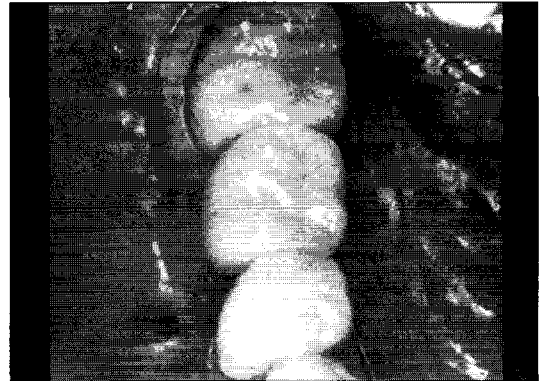


Fig. 19. Completed 3-unit PFG bridge, occlusal view.



Fig. 20. Completed 3-unit PFG bridge in centric.

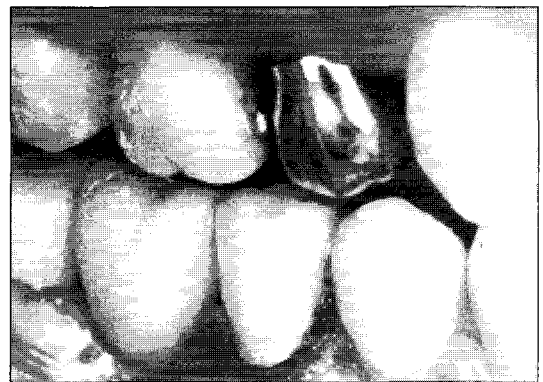


Fig. 21. Completed 3-unit PFG bridge in lateral excursion. Canine guidance is definite.

curves were reproducible. The casts were mounted on the fully adjustable articulator (Denar D-5A, Denar Corp.) (Fig. 18) and the final restoration was made. Minimal occlusal adjustment was done and the restoration was finally cemented (Figs. 19, 20, 21). The patient was satisfied with masticatory function.

## DISCUSSION

There are two occlusal schemes in the dentulous patients: unilateral balanced occlusion and mutually protected occlusion. In case of mutually protected occlusion, it is not so hard to adjust occlusion by using the general semi-adjustable articulator. But in group function, it is not easy. As the mandible slides to the lingual surface of the canine, posterior teeth begin to disclude from the second molar to the first premolar on the working side in the group function mechanism.<sup>10</sup> This sophisticated relation is difficult to achieve by gnathologic instruments. Functionally generated path concept makes the problem solved more easily.

Many dentists try many things in order to solve the esthetic problems. When esthetics is not satisfactory, the patients complain of it. It is very stressful to the dentist. But how about occlusion? Many patients do not perceive the slight interference of occlusion more sensitively than esthetics. So dentists tend to overlook it. But case 2 shows that FGP technique was not complicated and intraoral occlusal equilibration was minimal to achieve group function pattern. The patient was also comfortable in mastication.

In case 3, pantographic tracing is complicated and a time-consuming procedure. But, it is helpful to diagnose TMJ problems.<sup>4,7,8</sup> Also, it gave the operator many informations to deliver more satisfactory restoration—no occlusal interferences, stable masticatory function, etc.<sup>3,8</sup> pantographic trac-

ing is worth of trying when the patient has a slight TMJ problem or history of gnathosurgery, TMJ surgery, etc. although simple restoration such as 3-unit bridge is planned.

## CONCLUSION

It is concluded that various approaches need to be considered in relatively simple fixed restoration. But objective clinical study about which approach is superior according to the occlusal patterns is necessary.

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