

## Centric relation registration possibilities

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**Abstract:** Aim: Our aim was to compare the accuracy of conventional and instrumental method of centric relation registration by the complete edentulous patients in upper and lower jaw.

Material and Method: In our study was the file of 167 patients with upper and lower complete denture. The file of patients was divided into two groups. All patients were examined and the upper and lower complete denture were made. By 110 patients was the centric relation registration done using the instrumental method (gothic arch tracing) and by 57 patients was the centric relation registration done using the conventional method (Walkhof method modification using the occlusal rims).

Conclusion: The registration of the centric relation is more accurate using the instrumental method.

**Keywords:** Centric relation; Gothic arch tracing; Complete denture; Walkhof method modification

### I. INTRODUCTION

Exact registration of the centric relation by the edentulous patient is one of the main pillars of dentures stability and retention [6]. The denture stability and retention can be affected by the relation between the centric occlusion and centric relation, the probability of dentures stability is higher when the centric relation is identical with the centric occlusion – point centric occlusion. Centric relation (CR) is the most controversial concept in dentistry. The concept of CR emerged due to the search for a reproducible mandibular position that would enable the prosthodontic rehabilitation. Research in the field of CR has been controversial for more than 100 years. There are over 26 definitions of CR since the term was first developed as a starting point for making dentures. The most known definition is: centric relation is the most posterior relation of the mandible to the maxilla at a selected vertical dimension and it is the only position that is repeatable and given by the edentulous and edentulous patients [1, 2]. Centric occlusion (CO) is the relation of the teeth in the maximal intercuspation. The relation between them can be the point centric and long centric. Point centric is the situation when  $CR=CO$ , the long centric is the situation when  $CR \neq CO$  and the movement between them is called „slide in centric“. The complete dentures are more stable when the  $CR=CO$ . [3].

This registration of centric relation is possible using many different methods. This article is focused on two of them - the conventional method with the occlusal rims according to Walkhof, or modification of it (Fig. 1), and instrumental method - a gothic arch tracing [4] (Fig. 2). The gothic arch tracing is the method where the dentist need special equipment for registration and the dental technicians need semi or full adjustable articulator.

The aim of this paper is to compare conventional and instrumental method and statistical accuracy of each of them.



Figure 1 The occlusal rims



Figure 2 Gothic arch tracing

## II. MATERIAL AND METHODS

In This Study Was The File Of 167 Patients With Upper And Lower Complete Denture. A Total Of 167 Patients Were Examined Clinically On The Institute Of Dentistry And Oral Sciences, Palacky University In Olomouc, Czech Republic. The Patients Were Devided In To Two Groups: In The Group A Were 110 Patients By Which The Centric Relation Registration Was Done Using The Instrumental Method (Gothic Arch Tracing) And In The Group B Were 57 Patients By Which The Centric Relation Registration Was Done Using The Conventional Method (Walkhof Method Modification) (Table 1).

Table 1 Group A and B

Group	Number of patients	Female/Male
A – instrumental method	110	76/34
B – conventional method	57	29/28

By all patients was the relation between the centric occlusion and centric relation verified using the Dawson movement and asking the patient to bite. The movement between the CO and CR was checked. If there was no movement (no slide in centric) – CO=CR. If there was any movement (any slide in centric) - CR≠CO. All examinations were done by at least two examiners. The examiners were the attending physicians of the Institute of dentistry and oral sciences, Palacky University in Olomouc, Czech republic. All measurements were done in cooperation with students of Dentistry, Palacky University in Olomouc, Czech Republic, 5<sup>th</sup> study year. The measurements was register and evaluated.

## III. RESULTS

After evaluation of all cases the results – relation between the CO and CR by all patients from file - were given in to the table (Table 2). All informations were processed using the Fisher test and it has been demonstrated that in the group Gothic arch (CR registration was done using the gothic arch tracing) is significantly higher proportion (95.7%) of patients with CO = CR than in Walkhof (the CR registration was done using only the occlusal rims) group. Here, the proportion of patients is CO = CR, 78.8%, p = 0.0003 (Table 3).

Table 2 Distribution of CO=CR / CR≠CO

			CO / CR relation		Total
			CO = CR	CO ≠ CR	
Group	Walkhof	Number	67	18	85
	Gothic arch	Number	111	5	116
Total		Number	178	23	201

Table 3 Walkhof (conventional registration), Gothic arch (gothic arch tracing registration)

			CO / CR relation		Total
			CO = CR	CO ≠ CR	
Group	Walkhof	Number	67	18	85
		%	78,8%	21,2%	100,0%
	Gothic arch	Number	111	5	116
		%	95,7%	4,3%	100,0%
Total	Number		178	23	201
	%		88,6%	11,4%	100,0%

According to the Fisher test is significantly given higher accuracy of the centric relation using the gothic arch registration.

#### IV. DISCUSSION

In our study we compare two methods for centric relation registration – instrumentally using the gothic arch tracing and conventional using the occlusal rims. From our results it is given that the instrumental method using the gothic arch tracing is more accurate than the conventional method. This result is corresponding with studies done in other countries [5, 6].

#### V. CONCLUSION

Despite of all possibilities of centric relation registration are the conventional method using the Walkhof modified registration and the gothic arch tracing registration the most frequent procedures. Our study demonstrated that the accuracy of using the gothic arch method is higher. However, this method requires special equipment of the dental office and dental laboratory. It is only up to the dentist and dental technician if they are willing to spend time and money for these aids.

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