Original Article

# Co-Incidence of Centric Relation and Maximum Intercuspation in Relation to Canine Guided, Group Guided Occlusion and Gender



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## ABSTRACT

**Objective:** The aim of this study is to evaluate the coincidence of centric relation (CR) and maximum intercuspation position (MIP) in relation to canine guided, group guided occlusion and gender.

**Study Design:** Cross sectional study

**Place and Duration of Study:** This study was conducted at the Dow Dental College and Sir Syed College of Medical Sciences (dental section) for Girl, Karachi in November 2019 till February 2020.

**Materials and Methods:** Ninety-three subjects were selected according to the selection criteria by purposive sampling technique. Visual observation with articulating paper and subjective perception were the means to detect centric relation (CR) and maximum intercuspation position (MIP) coincidence in relation to canine guided, group guided occlusion and gender. Data was analysed by software SPSS 16. Pearson chi square was used to figure out the association of coincidence of centric relation and maximum intercuspation in relation to canine guided, group guided occlusion and gender.

**Results:** Group guided occlusion was more prevalent. Centric relation not coinciding with maximum intercuspation was also higher. However, no statistically significant association was found between centric relation and maximum intercuspation coincidence with canine guided, group guided occlusion and gender ($p>0.05$)

**Conclusion:** Coincidence of centric relation and maximum intercuspation is independent of canine guided, group guided occlusion and gender

**Key Words:** centric relation, maximum intercuspation, canine guided occlusion, group guided occlusion and gender

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## INTRODUCTION

Dental occlusion plays a pivot role for providing efficient treatment in all the disciplines of dentistry[1-4]. Occlusion refers to the setup of teeth in opposing dental arches and the way they come in contact. It may be static or dynamic.[5] Static occlusion occurs when the maxillary and mandibular teeth are in maximum intercuspation. This intercuspal position is also known as centric occlusion, habitual centric or habitual occlusion.

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Dynamic occlusion comprises of lateral and protrusive mandibular movements occurring during speech, chewing and deglutition[2].

Regarding dynamic occlusion, three different types of occlusions can be found during latrotrusive mandibular movements.

1. Balanced occlusion
2. Canine guided occlusion
3. Group guided occlusion

Balanced occlusion is the simultaneous contact of opposing teeth on right and left sides in lateral excursions, a concept used for complete denture occlusion for denture stability[1]. Canine guided occlusion in which only maxillary and mandibular canines comes in contact on working side (right or left) during lateral excursions. Group guided occlusion also termed as "unilateral balanced occlusion" or "group function" in which multiple teeth contact on working side (right or left) during lateral excursion.[6,7]

Centric relation (CR) is a musculoskeletal position with condyles in their most antero superior position in glenoid fossa.[8,9] It is a reproducible position and anatomically determined. Centric occlusion (CO) which

can also be a maximum intercuspation position (MIP) is dentally determined position.

Ideally functional occlusion should have features like CR coinciding with MIP and canine guided occlusion, so the question arises that whether there is an association between these features. Therefore, the objective of this study is to evaluate the association of CR and MIP coincidence in relation to canine guided, group guided occlusion and gender.

# MATERIALS AND METHODS

This study was conducted in Dow Dental College and Sir Syed College of Medical Sciences (dental section) for Girl, Karachi in November 2019 till February 2020. Ninety-three subjects were examined during this study from both the genders with a mean age of 22.22 years. Visual examination was done under dental chair light. Mouth mirror was used to retract the cheeks. The examination was done by two operators to ensure inter operator reliability and validity.

To observe the type of occlusion in lateral excursions (canine guided and group guided), subjects were asked to sit in an upright position on dental unit with Frankfort horizontal plane almost parallel to the floor. Articulating paper of 80 micron (Coltene, Germany) was placed between opposing teeth during lateral excursions. Articulating spots during lateral excursions were observed for both working sides (right and left) to determine the type of occlusion.

To observe the CR and MIP coincidence, bimanual manipulation method was used. Patient was kept in an almost supine position on the dental chair with operator at the back of the chair and lower jaw was passively manipulated. Patient was then asked to close the mandible and note the first tooth contact. If all the teeth contact simultaneously with maximum intercuspation at the first tooth contact, CR was regarded coincident with MIP and vice versa. Data analysis was done by using SPSS 16. Chi square test was used to analyse the association of CR and MIP coincidence in relation to canine guided, group guided occlusion and gender.

**Inclusion Criteria:**

1. At least 28 permanent teeth present.
2. Patients, attendants, students, doctors and staff.
3. No TMJ disorder.
4. No attrition.

**Exclusion Criteria:**

1. Subjects undergoing orthodontic treatment.
2. Subjects with fixed or removable prosthesis.
3. Carious teeth involving cusps.
4. Subjects with a history of craniofacial trauma.
5. Non cooperative subjects.
6. Presence of bilateral balanced occlusion.
7. Discrepancy in presence of same occlusion i.e. canine guided or group guided on both sides

# RESULTS

This study included 93 subjects from 13-50 years of age. Mean age was 22.22 years. 10 (10.3%) were males and 83 (83.7%) individuals were females (Table 1).

Out of 93 subjects, (10 males and 83 females) only 6 males and 34 females (total 40) had coincidence present and the in the rest it was absent (Table 2).

Coincidence of CR and MIP was independent in relation to gender. Chi-square ($p>0.05$)

Out of 93 subjects 9, (males and females) had canine guided occlusion in which 6 had coincidence of CR and MIP and in remaining 3 it was absent. 84 (males and females) had group guided occlusion. CR and MIP coincidence was present in 37 and in remaining 47 it was absent. In total 43 had coincidence of CR and MIP and in the remaining 50 it was absent (Table 3).

Coincidence of CR and MIP was independent in relation to canine guided and group guided occlusion. Chi-square ($p>0.05$).

**Table No.1: Frequency distribution of gender**

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 10 | 10.3% |
| Female | 83 | 83.7% |
| Total | 93 | 100.0% |

**Table No.2: CR and MIP in relation to gender**

| Gender | CR and MIP coincidence (present) | CR and MIP coincidence (absent) |
|---|---|---|
| Male | 6 | 4 |
| Female | 34 | 49 |
| Total | 40 | 53 |

**Table No.3: CR and MIP in relation to canine guided and group guided occlusion**

| Type of occlusion | CR and MIP coincidence (present) | CR and MIP Coincidence (absent) |
|---|---|---|
| Canine guided | 6 | 3 |
| Group guided | 37 | 47 |
| Total | 43 | 50 |

# DISCUSSION

Occlusion plays an important role in all the disciplines of dental sciences since it influences the dentition, periodontium as well as temporomandibular joint. Favourable occlusion allows these structures to perform their physiological functions smoothly whereas unhealthy occlusion can cause muscular and temporomandibular diseases. Therefore, both static and dynamic components of occlusion contribute towards the maintenance of stomathognathic system.[10]

Numerous studies have been conducted to evaluate the prevalence of occlusal patterns during mandibular lateral excursions but at different mandibular positions.[11,12] This accounts for vast variation among

the results. Many studies recorded the occlusal contacts in canines' edge to edge position.[13] This position is mainly used for incising food and during para functional habits. Since it is more preferable to have a normal chewing pattern rather than specifically moving the mandible to specific dimensions in a lateral direction, therefore in this study lateral contact patterns were recorded in a normal chewing fashion[13].

Different techniques have been provided in literature to obtain centric relation position. These can be operator guided and patient guided. Operator guided methods has shown some promising results but without consensus that which type of operator guided method is best. Bimanual manipulation (a type of operator guided method) used in this study to make the candidate close in centric relation is one of the recommended method in published studies[14].

Different studies[15,16] have used different materials to observe occlusal contacts. Articulating paper used in this study produces more occlusal contacts than the other material also shown in the study of Saad et al[15]. One could argue on the thickness of the articulating paper used in this study because earlier studies have shown to recommend the thickness of less than 21 micron of occlusal registration strips.[17] As per authors' search there is no consensus on material and thickness of occlusal registration strip to be used and also as per ease of availability 80 micron was used.

Gupta et al conducted a study to find out occlusal contact patterns during lateral excursion. Results showed that around 81% of the contact patterns were group function/guided with shim stock and 93% when articulating paper was used[6] which is in accordance to our study. Study by Asawaworarit et al also showed prevalence of group guided occlusion in Thai people. However these findings are against the finding of Aslam et al[13].

Various researches have been performed to elaborate centric occlusion and maximum intercuspation discrepancy among different population samples and their association with TMJ dysfunction[19,20]. A research including 40 subjects was conducted between 2014 and 2015 in Romania. Results revealed 85% of the subjects had vertical while 87.5% had horizontal CR-MI discrepancy for both condyles[8].

In this study centric relation and maximum intercuspation was not coinciding in most of the individuals which is in accordance to other studies.[21] In this study no association was found between centric relation and maximum intercuspation coincidence with gender which is in accordance to the study of Koc et al[22].

However, as per authors' search, none of the studies could be found where there is, an association of centric relation and maximum intercuspation coincidence with canine guided and group guided occlusion is observed so a direct comparison cannot be made.

# CONCLUSION

Coincidence of centric relation and maximum intercuspation is independent of canine guided, group guided occlusion and gender.

**Author's Contribution:**

| | |
|---|---|
| Concept & Design of Study: | Shazia Kiran |
| Drafting: | Kashif Aslam, H.R. Sukhia |
| Data Analysis: | Saad ud din Siddiqui, Syed Kashif Abrar |
| Revisiting Critically: | Shazia Kiran, Kashif Aslam |
| Final Approval of version: | Shazia Kiran |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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