A COMPARATIVE STUDY TO EVALUATE THE OCCLUSAL CONTACTS AMONG THE TRIBAL AND URBAN POPULATION DURING LATERAL ECCENTRIC MANDIBULAR MOVEMENTS.

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BRANCH I

PROSTHODONTICS AND CROWN AND BRIDGE

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Certificate

CERTIFICATE

This is to certify that the dissertation titled "**A COMPARATIVE STUDY TO EVALUATE THE OCCLUSAL CONTACTS AMONG THE TRIBAL AND URBAN POPULATION DURING LATERAL ECCENTRIC MANDIBULAR MOVEMENTS..**" is a bonafide record of work done by **Dr. VIDHIYASAGAR. P.** under my guidance during his postgraduate study period between **2009 – 2012.**

This dissertation is submitted to **THE TAMILNADU Dr. M.G.R MEDICAL UNIVERSITY**, in partial fulfilment for the degree of **MASTER OF DENTAL SURGERY** in **Branch I - Prosthodontics and Crown and Bridge.**

It has not been submitted (partially or fully) for the award of any other degree or diploma.

H.O.D AND GUIDE

Prof (Dr) V. R. Thirumurthy. M.D.S.,

Vice Principal,

Department of Prosthodontics including

Crown and Bridge and Implantology.

Sri Ramakrishna Dental College and Hospital, Coimbatore.

PRINCIPAL

Prof (Dr). V. Prabhakar M.D.S.,

Sri Ramakrishna Dental College and

Hospital,

Date :

Place : Coimbatore.

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1. Introduction

1. Introduction

The term “Occlusion” represents a broader concept than the arrangement of teeth. The masticatory system[40] (or stomatognathic system) is composed of three components: *the Teeth, the Periodontal tissues and the Articulatory system.*[22] Occlusion is a biological relationship of the components of the masticatory system.[40] Occlusion can be broadly classified into static occlusion and dynamic occlusion. In rehabilitation of the natural dentition, the two factors dominating the dynamic occlusion are *the temporomandibular joints and the anterior guidance*. Anterior guidance is determined by the contact of the palatal contours of maxillary anterior teeth to the incisal-facial surfaces of the mandibular anterior teeth.[64] Anterior guidance is essential for a harmonious functional relationship in the masticatory system.[68] Anterior guidance has a prominent role in dentistry because they are essential for esthetics, phonetics, and mastication. They have an equally important function in protecting the posterior teeth by posterior disclusion during mandibular excursions. The biologic protective mechanism is activated by occluding on the anterior teeth and suppressing the activity of the elevator muscles.[75]

The pattern of anterior guidance is influenced by the amount of overjet and overbite. When there is loss of anterior guidance, all the functional forces are transmitted to the remaining posterior teeth. The stress placed on these teeth, especially during lateral movements, results in excessive forces and may affect the dental and periodontal structures (occlusal trauma, fracture of teeth).[57] The mandible acts as a class three lever system i.e. In this system any force applied creates a greater stress on an object placed closest to the fulcrum

(The temporomandibular Joint). Therefore, the teeth farthest from the fulcrum can guide the mandible with the least amount of stress being applied to them.[28,50] The anterior teeth, especially the canines, possess a favourable bony support and reduce the forces transmitted to the posterior teeth during lateral functional movements. Often, the central incisors support protrusive contacts and contribute to the disengagement of the posterior teeth. When the molar teeth guide the mandible during lateral movement more forces will be applied.

The anterior teeth are considered to be more sensitive to pressure changes than the posterior teeth. In normal vertical and horizontal overlap occlusal relationships, the anterior teeth have the potential for deflecting the pathologic contacts in the posterior quadrants. In patients lacking anterior guidance with open bite and anterior crossbite, the pathologic changes are magnified and elude deflection. Although the incidence of patients with these clinical conditions is low, the treatment is arduous and the prognosis is guarded.

When the posterior teeth must be restored, anterior guidance influences the morphological pattern as well as the height of the cuspal inclinations of the teeth. The weaker the degree of anterior guidance (open bite, minimal overbite), the less the occlusal surfaces of the posterior teeth should be accentuated. When several anterior teeth must be restored, an anterior guidance must be reproduced or recreated in harmony with the occlusion of the posterior teeth during all mandibular movements.

Ideally, anterior guidance should be *retrieved, re-established or adjusted* when

1. Several teeth in the anterior sextant are restored

2. Restoration of canine that supports the occlusion in lateral excursions

3. The vertical dimension is modified such as in the case of complete rehabilitation.

Anterior guidance can be categorized into three occlusal schemes: *Canine protection, Group Function, and Balanced occlusion*. Canine protection and group function have been described as forms of therapeutic occlusion in the natural dentition, based on the theoretical background and clinical failure of balanced occlusion.[40,29,70,79]

Canine-protected occlusion,[72,73] was described by **D'Amico**, and others, when the canines guide the lateral mandibular movement; and group function,[13,45,67] was described by **Beyron** and others, implying contact on several teeth with or without canine guidance during lateral mandibular movement. The basis for the canine-protected occlusion theory is D'Amico's belief that the canines act as natural stress breakers to guide the mandible, whereas the group function theory is based on **Beyron's**[15] observations and ideas on dissipating lateral occlusal forces.

In The Glossary of Prosthodontic Terms[1], canine protection is defined as *"A form of mutually protected articulation in which the vertical and horizontal overlap of the canine teeth disengages the posterior teeth in the excursive movements of the mandible."* Group function is defined as *"Multiple contact relations between the maxillary and mandibular teeth in lateral movements on*

the working side." However, the occlusal contact pattern varies according to the mandibular position examined.[2,38,78,84]

The dentist restoring an entire occlusion may prefer one occlusal scheme, the dentist restoring only a portion of an occlusion must restore the mouth so as to complement its existing occlusal scheme , if proven healthy. The restored part must not conflict with the existing occlusal scheme. The two occlusal schemes have many similarities and some differences. **McAdam** (1976) reported that both canine guidance and working side group function occlusions are physiologically acceptable in natural dentition. Canine guidance is decreased due to wear and a gradual transformation to a group-function type of occlusion takes place. Since both occlusions appear often naturally and are capable of maintaining good dental health, each should be regarded as normal.

The search in the literature revealed that *the relation between the type of food habit and the dynamic occlusal scheme has not yet been studied in detail*. It is evident that in the modern food processing system softer diet is available to urban population. In spite of all the developments there are tribes living in remote places lacking basic facilities. Their diet is mainly composed of coarse, fibrous and raw food materials. There is no evidence based research to relate the type of food ingested to the prevalence of various dynamic occlusal schemes.

2. Aims and Objectives

2. Aims and Objectives

The aim of this study was to determine the nature of anterior guidance present in natural dentition among tribal and urban population.

The objective of the study was to compare the difference in occlusal schemes during right and left mandibular lateral excursive movements among tribal population and urban population, to analyze the relation between dietary pattern and occlusal scheme and to assess the occlusal scheme transition in correspondence to age.

The objectives of this study was;

Tribal:

O1 : To compare the difference in occlusal schemes in Right and left side during lateral mandibular excursive movement among Tribal Population.

O2 : To compare the difference in occlusal schemes in Right lateral mandibular excursive Movement in Vegetarians and Non-vegetarians among Tribal Population.

O3 : To compare the difference in occlusal schemes in Left lateral mandibular excursive movement in Vegetarians and Non-vegetarians among Tribal Population.

Urban:

O4 : To compare the difference in occlusal schemes in Right and left side during lateral mandibular excursive movement among Urban Population.

O5 : To compare the difference in occlusal schemes in Right lateral mandibular excursive movement in Vegetarians and Non-vegetarians among Urban Population.

O6 : To compare the difference in occlusal schemes in Left lateral mandibular excursive movement in Vegetarians and Non-vegetarians among Urban Population.

Tribal and Urban

O7 : To assess the age in which occlusal contact transition occurs in tribal and urban population.

3. Review of Literature

3. Review of Literature.

B. Ingervall (1972).[39]

Functional and non-functional side contacts in a 3 mm lateral position of the mandible were recorded in 50 children (mean age 11 years) and in 50 adults (mean age 23 years). No significant difference was found between children and adults in the number of tooth contacts. The most striking finding was the high frequency of non-functional side contact. 66 per cent of the children and 64 per cent of the adults had bilateral non-functional side contact and an additional 20 per cent in both groups had unilateral non-functional side contact. Canine-protected occlusion was found unilaterally in 18 per cent and bilaterally in only 2 per cent of the adults.

Gary Robert Goldstein (1979).[25]

A clinical evaluation was made on 1,000 teeth in 100 patients with Angle's Class I occlusion who were free from histories of orthodontics, removable or fixed prosthesis, occlusal equilibration, maxillary or mandibular jaw fractures, and systemic diseases. The study was made to determine if there was a relation between their patterns of disclusion and a periodontal disease index. In this study, 14% of the subjects exhibited canine protection, 16% exhibited a pattern called progressive disclusion, 46% group function, and 24% a different

disclusion pattern on each side The individuals having canine protected occlusion had significantly lower mean periodontal disease index scores than individuals having progressive disclusion or group function. Also canines and molars in the canine protected occlusion exhibited lower means periodontal disease scores than their counterparts in the progressive disclusion or group function categories.

Siebert G (1981).[71]

Physiological tooth movements during mandibular excursions with and without occlusion have been considered. Using electronic and pantographic techniques, anterior guidance and tooth movements during simulated mastication (without a bolus) were investigated. Investigations in the absence of occlusion showed that elastic deformation of the mandible gave rise to tooth movements. During occlusion three-dimensional tooth movements of up to 60 µm in each direction occurred. Pantographic measurements of anterior guidance showed that each type of occlusion (balanced occlusion, group function and canine protected occlusion) has its own characteristic. It was concluded that canine protected occlusion was more physiologically acceptable than others.

Belser UC, Hannam AG (1985).[10]

The effect of four different occlusal situations (group function, canine guidance, working side occlusal interference, and

hyperbalancing occlusal interference) on EMG activity in jaw elevator muscles and related mandibular movement was investigated. When a naturally acquired group function was temporarily and artificially changed into a dominant canine guidance, a significant reduction of elevator muscle activity was observed when subjects exerted full isometric tooth-clenching efforts in a lateral mandibular position.

The original muscular coordination pattern (relative contraction from muscle to muscle) remained unaltered during this test. With respect to unilateral chewing, no significant alterations in the activity or coordination of the muscles occurred when an artificial canine guidance was introduced. Introduction of a hyperbalancing occlusal contact caused significant alterations in muscle activity and coordination during maximal tooth clenching in a lateral mandibular position.

The results suggest that canine-protected occlusions do not significantly alter muscle activity during mastication but significantly reduce muscle activity during parafunctional clenching. They also suggest that non-working side contacts dramatically alter the distribution of muscle activity during parafunctional clenching and that this redistribution may affect the nature of reactive forces at the temporomandibular joints.

Arturo Manns, Clifford Chan, Rodolfo Miralles (1987).[8]

The purpose of this study was to determine which of the two occlusal guidances schemes (group function and canine guidance) causes a greater reduction in muscle activity and thereby a decrease in muscle tension in eccentric mandibular positions. The results showed an EMG activity reduction of the elevator muscles with group function relative to their activity in centric occlusion.

A more marked reduction was observed on the mediotrusive side, mainly in the temporal muscle. With canine guidance, the reduction in elevator muscle activity was much greater, more significant, and mainly in the temporal muscle of the mediotrusive side. The clinical implications of this study suggest the use of canine guidance in laterotrusion for therapy with full-coverage occlusal splints.

Ogawa M, Ogawa T, Koyano K, Suetsugu T (1998).[53]

The purpose of this study was to investigate the effect of an altered inclination of the canine guidance on the pattern of the condylar movements during laterotrusion. The inclination of the canine guidance was steepened approximately 10 degrees by attaching a metal overlay to the lingual surface of the maxillary working-side canine.

After the canine guidance was steepened, the working-side condyle moved even more anteriorly and inferiorly. In contrast, little change was found in the direction and the amount of movement in the

nonworking-side condylar. The results of this study suggest that there is a relationship between the steepness of canine guidance and the pattern of the working-side condylar movement, but not between the steepness of the canine guidance and the pattern of the nonworking-side condylar movement.

Hobo S, Takayama H (1989).[34]

The purposes of this study was to compare the relationship of anterior guidance with condylar movement and to analyse the three-dimensional relationship of canine guidance and the working condylar path. The mandibular movements of ten subjects with normal dentitions and no observable temporomandibular joint abnormalities were recorded using an electronic mandibular measuring system capable of measuring six degrees of freedom. It was shown that the movements of the working condyle were affected by anterior guidance. When canine guidance was not consistent with the working condylar path, there was a sagittal displacement of the working path created to compensate for the lack in harmony.

Rodolfo Miralles, Ricardo Bull, Arturo Manns, Enrique Roman (1989).[60]

Electromyographic recordings were made from the anterior temporal and masseter muscles during maximal voluntary clenching with complete dentures in the intercuspal position and in the laterotrusive jaw position with balanced occlusion and canine guidance.

The different pattern of activity of the two muscles in the laterotrusive occlusal schemes studied suggested that their motor neuron pools receive different inputs. The lower activity in both muscles with canine guidance suggests that canine guidance might be a significant factor for preventing parafunctional activity in edentulous patients.

James P. Coffey, Parker E. Mahan, Charles H. Gibbs, Boyd B. Welsch D (1989).[41]

The study was done to examine the influence of lateral retrusive and lateral protrusive tooth guidance on the movements of working condyles of the lateral pole. The results indicated that the condition of the patient's temporomandibular joints was a crucial factor in obtaining of condylar tracings. Condylar tracings from patients with incoordinated condyle-disk assembly were inconsistent and unreproducible. Consistent, reproducible tracings from patients without condyle-disk disorders indicated that lateral retrusive guidance could cause a more posterior pathway of the lateral pole of the working condyle than lateral protrusive guidance.

Hofmann M, Knauer G (1990).[35]

The effect of canine guidance with guiding angles of 70, 55 and 30 degrees in relation to the median sagittal plane and balanced occlusion on the kinetics of upper complete dentures was investigated both in an in-vitro-experiment and in patients. It appeared that canine-

guided dentures led to considerable dislocations during tooth-guided lateral movements, whereas balanced occlusion caused only minor movements, which were always directed toward the alveolar ridge.

Korioth TW (1990).[43]

Bilateral interocclusal registrations were made of two working-side mandibular positions of 45 healthy young adults with morphologically good occlusions. The occlusal contacts were analysed according to frequency and location. A large number of subjects presented unclassified patterns of articulations. In the group with known occlusal schemes, more individuals had "canine guidance" on the left side, whereas the most frequent pattern on the right side was "partial group function."

Fitins D, Sheikholeslam A(1993).[23]

The effect of canine guidance of a full-arch maxillary flat occlusal splint on the level of activation of the anterior and posterior temporalis, masseter and suprahyoid muscles during maximal clenching, was studied in 14 subjects without craniomandibular disorders. The results revealed that in canine guidance , the level of electromyographic activity of anterior and posterior temporalis and suprahyoid muscles during maximal clenching on the occlusal splint in

habitual closure was unchanged, as compared to biting in the intercuspal position.

Akören AC, Karaağaçlioğlu L (1995).[4]

The occlusal schemes (canine guidance and group function) in relation to masticatory muscle activity were investigated . It was performed on 30 subjects, 15 with canine guidance and 15 with group function. Bilateral electromyographic recordings of masseter and anterior temporal muscles were obtained by surface electrodes during gum chewing and sliding laterally from centric relation while the teeth were in contact. Electromyograms were evaluated visually. It can be concluded from the study that there was no significant difference between the occlusal schemes. However, canine guidance showed a narrower chewing model than group function and reduced anterior temporal muscle activity during sliding. This suggested that in the presence of healthy and good supportive canine teeth, canine guidance occlusion will be preferable.

G.L. Borromeo, T.I. Suvinen, P.C. Reade (1995).[14]

This study was done to investigate the role of canine guidance and group function on masseter muscle function of normal subjects. Two types of interocclusal devices were constructed for each of the 10 subjects. Two ME 1020 EMG analyzers and bipolar Ag/AgCI electrodes were used to record the electromyographic activity of

masseter muscles in centric occlusion, left and right laterotrusive movements in natural dentition. The EMG activity was also assessed with adjusted and intentionally unadjusted interocclusal devices in place. It was concluded that there was no difference in masseter muscle electromyographic activity between the use of interocclusal devices designed for canine guidance and for group function in normal subjects.

W.Alex Willis (1995).[5]

Fifty consecutively treated TMD patients were evaluated with the TMJ Scale before and after treatment. A group of 11 similar patients identified as having TMD, but who declined treatment, were used as a control group. This study suggested that a splint design incorporating extreme canine guidance with limited lateral movement may be effective in the treatment of temporomandibular dysfunction (TMD) symptoms.

K. Koyano, T. Ogawa, T. Suetsugu (1997).[44]

This Study investigated the definite influence of the working-side canine and balancing-side condylar guidances on mandibular lateral movement. The inclinations of the paths were calculated on the working-side canine, incisor, balancing-side first and second molars and balancing-side condylar points in the frontal plane. The canine path showed greater influence than the condylar path even on the balancing-side second molar path.

There was no difference between male and female subjects in the influential ratio of the canine guidance to the condylar guidance on any tooth path. It was concluded that the influence of the anterior and posterior guidance on the lateral movement varied according to the type of tooth, but not to the gender of the subject. This functional characteristic was confirmed by the morphological finding that the relative location of the molars in relation to canine and condyle did not differ between the sexes.

G. Grubwieser, A. Flatz, I. Grunert, M. Kofler, H. Ulmer, K. Gausch, S. Kulmer (1999).[31]

The aim of this analysis was to get quantitative data out of EMG-records. It was concluded that the neuromuscular function in edentulous subjects was similar to that found in dentulous subjects. Furthermore, the study statistically proved that a stent with anterior guidance significantly showed lesser muscular activity when compared to stent with bilateral balanced occlusion.

Julian Kahn, Ross H. Tallents, Richard W. Katzberg, Mark E. Ross, William C. Murphy (1999).[42]

This study was done to evaluate the prevalence of molar relationship, lateral guidance, nonworking side contacts and

intraarticular temporomandibular disorders. The most prevalent molar relationship was Class I. Symptomatic patients had a higher prevalence of Class II molar relationships compared with the asymptomatic volunteers with normal joints.

There was a higher prevalence of canine guidance (52.04%) on the right side in the symptomatic patients with disk displacement. Volunteers with asymptomatic joints had a higher prevalence of one or more nonworking side contacts when compared with patients having disk displacement. This study suggested there were no systematic dental occlusal differences that clearly separate symptomatic from asymptomatic patients.

Yang and Yatabe (2000).[85]

The effect of different types of canine guidance on the patterns of the laterotrusive tracing at the incisal point was studied. They also investigated the relationship between the laterotrusive inclinations and the working side condylar movements. It was concluded that the horizontal and sagittal inclinations of laterotrusion had negative correlation with the anterior-posterior movements of the working side condyle. The bigger the horizontal and sagittal inclination, the more posterior the condyle moved. However, the frontal inclination had no correlation with the anterior-posterior movement of the condyle, even though it had correlations with the horizontal and sagittal inclinations.

Okano N, Baba K, Akishige S, Ohyama T (2002).[54]

Mandibular displacement and masticatory muscle activity during clenching in lateral occlusal position in relation to the lateral occlusal pattern was investigated. When compared to the simulated group function occlusion, the simulated canine protected occlusion and balanced occlusion caused statistically significant smaller superior displacements of the non-working side condyle, which suggested that they might result in reduced temporomandibular joint (TMJ) loading. Furthermore, the simulated canine protected occlusion was associated with the lowest EMG activity, which suggested that this occlusal pattern had the capacity to reduce the level of parafunctional activity.

Leiva M, Miralles R, Palazzi C, Marulanda H, Ormeño G, Valenzuela S, Santander H (2003).[46]

This study was conducted to determine the effects of laterotrusive occlusal scheme and body position on bilateral sternocleidomastoid electromyographic (EMG) activity. Integrated EMG (IEMG) activity was recorded seated upright with the head unsupported and in the right and the left lateral decubitus body positions, under the following experimental conditions: 1. Maximal voluntary clenching in the intercuspal position; 2. Laterotrusive occlusal excursion with canine guidance; 3. Laterotrusive occlusal excursion with group function.

Bilateral sternocleidomastoid IEMG activity with canine guidance or group function was significantly lower than the intercuspal position in both body positions. In the seated upright position, significantly lower activity was observed with canine guidance than in group function. In the lateral decubitus position, activity was similar with both laterotrusive occlusal schemes and significantly higher when seated upright. Results suggest that both laterotrusive occlusal scheme and body position have significant influence on sternocleidomastoid IEMG activity.

Peroz I, Leuenberg A, Haustein I, Lange KP (2003).[56]

Two occlusal concepts for the setup of complete dentures: canine guidance and balanced occlusion were studied in a randomized clinical trial of 22 patients. Patients assessed canine-guided dentures to be significantly more satisfying in esthetic appearance, mandibular denture retention and chewing ability.

The ability to speak and the retention of maxillary dentures were not influenced by the occlusal concept according to the patients' opinion, whereas the examiners found that maxillary canine-guided dentures lost retention more frequently during eccentric movements than balanced dentures.

The objective inspection of mandibular denture retention underscored the patients' assessment, showing that the mandibular

canine-guided dentures were much more stable during laterotrusive and protrusive movements. Canine guidance could be used successfully in complete denture treatment as it provides better mandibular denture retention, esthetic appearance and chewing ability.

Stephen Davis, ziad Al-Ani, Huw Jeremiah, Daniel Winston, Philip Smith (2004).[74]

The study was aimed to test the reproducibility of a quick and simple means of recording marked occlusal contacts. The results suggested that marking occlusal contacts on a transparent acetate sheet provided a simple means of recording static and dynamic occlusal contacts with high degree of reproducibility.

Bengt Ingervall, Roland Hahner, Stephan Kessi (2005).[11]

The aim of the study was to determine the tooth contact pattern in laterotrusive, protrusion of the mandible and in the retruded position. On protrusion, most subjects had contacts only on anterior teeth. Protrusive contacts only on posterior teeth were rare. On laterotrusion, most subjects had group function on the functional side. Contact on the nonfunctional side was found in half of the subjects in a 1.5 mm laterotrusive position and in one third of them in a 3 mm laterotrusive position. No correlation between the types of tooth contacts and mandibular dysfunction was found.

Salsench J, Martínez-Gomis J, Torrent J, Bizar J, Samsó J, Peraire M (2005).[62]

The study was done to assess the duration of different phases of the chewing cycle and the height of the masticatory cycle in relation to the type of lateral guidance. Women showed significantly longer chewing cycle than men. Subjects with canine protection showed the highest lateral guidance angle and the highest chewing cycle duration.

Celeste V. Kong, Y.L. Yang, W.L.Maness (2006).[16]

A clinical study was conducted to compare two occlusal registration methods (Occlusal indicator wax and Accuflim) with T-scan system for the identification of guided occlusal contacts. Wax and accuflim materials were significantly different in their agreement on guided closure contacts. The T-scan system demonstrated less of a disparity with both methods but more closely resembled the occlusal indicator wax material. The CP-MIP slide also significantly affected the agreement between methods during identification of guided closure contacts.

B.Y. Huang, T. Whittle, G.M. Murray (2006).[37]

The inferior head of lateral pterygoid (IHLP) is thought to play a critical role in the generation and control of lateral jaw movements. The

aim of this study was to test the hypothesis that a change to the lateral tooth guidance (working-side occlusal alteration, OA) resulted in a significant change in the electromyographic (EMG) activity of the inferior head of lateral pterygoid.

The inferior head of lateral pterygoid activity was significantly ($p < 0.05$) increased with the occlusal alteration during the outgoing (movement from intercuspal position to ~5 mm right) and return phases of laterotrusion. The other muscles demonstrated no change or a significant decrease in activity. These findings suggested that a change to the occlusion on the working-side in the form of a steeper guidance necessitated an increase in inferior head of lateral pterygoid activity to move the mandible down the steeper guidance.

Okano N, Baba K, Igarashi Y (2007).[55]

The influence of experimentally altered occlusal guidance on masticatory muscle activity was investigated. EMG activity in the anterior temporalis significantly increased in the simulated group function occlusion and the simulated bilateral balanced occlusion compared with the simulated cuspid protected occlusion. The increased teeth contacts to the posterior region altered the unilateral pattern of the anterior temporalis activity to the bilateral pattern, while that of masseter activity remained unchanged.

Asja Celebic, Zilic Iva Alajbeg, Sonja Kraljevic-Simunkovic, Melita Valentic-Peruzovic (2007).[9]

The study was conducted to test the hypothesis that altered incisal guidance and a different number of working-side occlusal contacts in complete denture wearers change a pattern of temporal muscle activity and loadings to the mandible during clenching in incisal and lateral positions.

The Complete denture wearers exhibited significantly higher posterior temporal muscle activity in intercuspal position and during lateral biting on mediotrusive side than dentate subjects. Their coronoid process had to be pulled backward by temporal muscle fibers to rotate condyle in a counter-clockwise direction (Condylar guidance > Incisal Guidance); contrary dentate subjects had to rotate condyle in a clockwise direction to compensate for vertical overlap (Incisal guidance > Condylar guidance).

Group function allowed more working-side contacts in complete denture wearers and significantly higher anterior temporalis activity. Alteration of Incisal guidance: Condylar guidance ratio and a number of occlusal contacts during lateral clenching changed the pattern of anterior temporalis and posterior temporalis activity and direction of mandibular loading in complete denture wearers, although age related changes might also be responsible.

Rehmann P, Balkenhol M, Ferger P, Wöstmann B (2008).[57]

This clinical single-blind study aimed to evaluate the influence of 2 occlusal concepts on patient satisfaction in the initial phase after fitting new complete dentures. Thirty-eight edentulous patients received 1 new maxillary complete denture and 2 almost identical mandibular complete dentures, which differed only in their occlusal concepts (bilateral balanced occlusion vs canine guidance). After 2 weeks, the patients' satisfaction was evaluated and the occlusal contact was changed. Two weeks later, the patients' satisfaction was re-evaluated. After 2 and 4 weeks, 63% and 47% of the patients preferred bilateral balanced occlusion and 5% and 11% preferred canine guidance, respectively. Thus, a bilateral balanced occlusion primarily facilitates the adaptation of a new complete denture.

4. Materials and Methods

4. Materials and methods

The study included 900 subjects (450 Tribals and 450 urban population) with age ranging from 17 to 65. The subjects of tribal population were selected from Masinagudi – a tribal village near Ooty and from a tribal village in Thimbam forest in Sathiyamangalam. The subjects of urban population were selected from the district of Coimbatore. All the patients were informed about the purpose of the study and verbal consent was obtained.

Inclusion and exclusion criteria were set for sample population selection. The inclusion criteria was

1. Presence of complete natural permanent dentition with minimal intraarch malalignment.
2. Absence of temporomandibular joint pain during function or palpation.
3. Absence of Periodontal complaint.
4. No history of orthodontic therapy.
5. No history of occlusal equilibrations performed.
6. Teeth with restorations other than on the occlusal and incisal surfaces.
7. Asymptomatic teeth with pit and fissure caries without destruction of dental cusps.

The exclusion criteria for the study are

1. Partial edentulism.
2. Severe intraarch, interarch malalignment.
3. Impacted teeth.
4. Presence of fixed or removable partial dentures.
5. Restorations involving occlusal surfaces and incisal surfaces.
6. Temporomandibular dysfunction.
7. Periodontally compromised dentition.
8. Presence of severe attrition or parafunctional habits.

Total of 900 cases were recorded with 450 subjects in each group (T,U). The groups (T,U) were divided into three subgroups based on their age (T1 ,T2 , T3 and U1 , U2 , U3) . These groups were further categorized into vegetarians (V) and non-vegetarians (NV).

- **Group T – Tribal Population** 450 subjects
    - *Subgroup* T 1 – Age 17 to 28 years – 150 subjects.
        - Class VT1 , Class NVT1
    - *Subgroup* T 2 – Age 29 to 40 years – 150 subjects.
        - Class VT2 , Class NVT2
    - *Subgroup* T 3 – Age above 41 years. – 150 subjects.
        - Class VT3 , Class NVT3
- **Group U – Urban Population** 450 subjects
    - *Subgroup* U 1 - Age 17 to 28 years– 150 subjects.

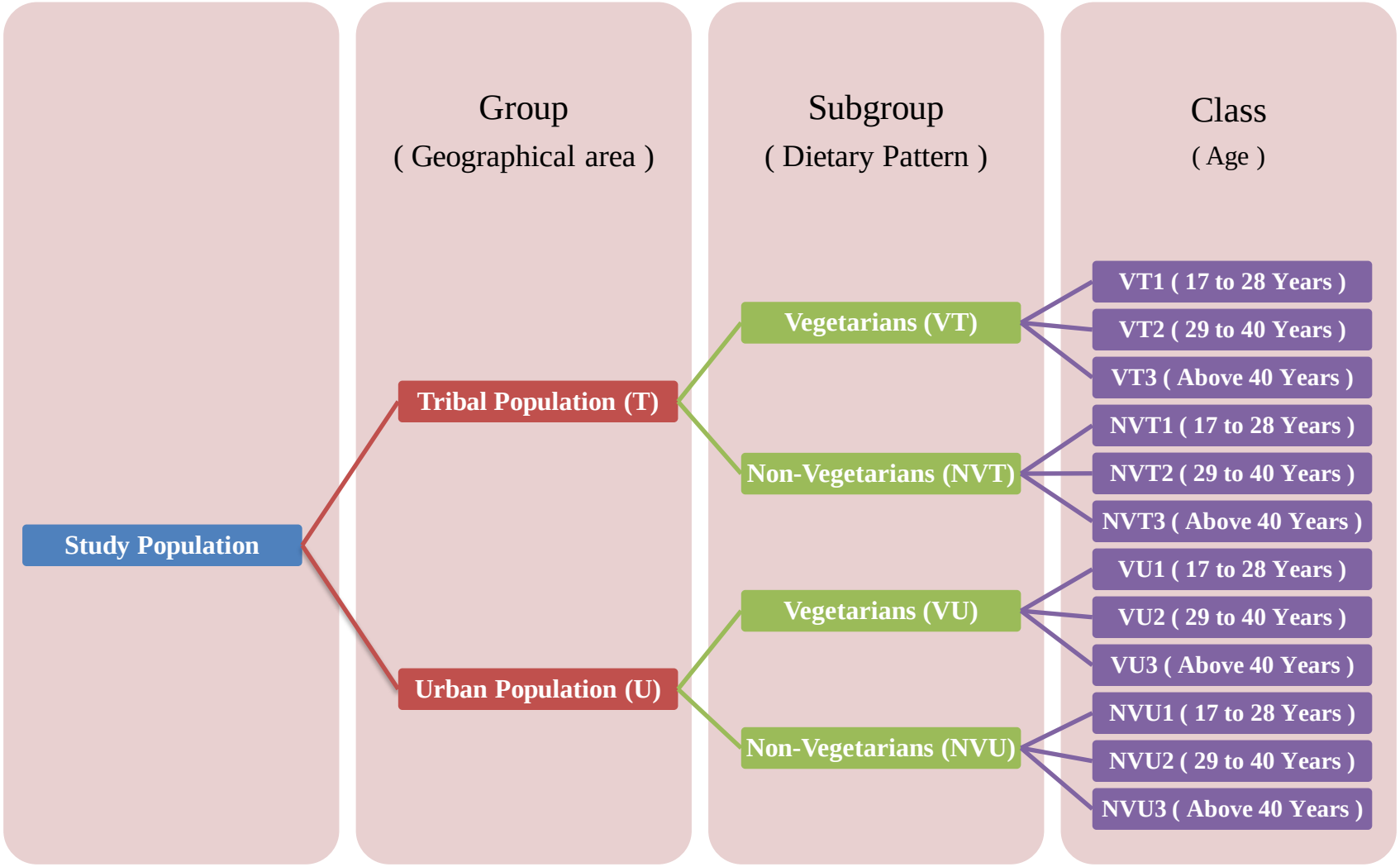
- Class VU1 , Class NVU1

- *Subgroup* U 2 - Age 29 to 40 years– 150 subjects.
  - Class VU2 , Class NVU2

- *Subgroup* U3 - Age above 41 years. – 150 subjects.
  - Class VU3 , Class NVU3

A basic set of questions enquiring about the personal details and dietary habits of each participant was prepared. The questions were explained in local language and details were obtained from each participant. Based on the questionnaire and response the subtypes were categorized as vegetarians and non-vegetarians.

Study Layout



Occlusal examination.

The study was conducted to determine the occlusal contacts in mandibular lateral excursive positions. The armamentarium for performing occlusal examination includes

1. Mouth mirror.
2. Periodontal probe
3. Explorer.
4. Occlusal registration strips (12 µm thick black and red coloured, Wipmix, Louisville, USA).
5. Shimstocks (12 µm thick Bausch, Cologne, Germany).
6. Miller's forceps.
7. Tongue and cheek reflector.
8. Cotton to wipe of markings.

Occlusal evaluation method

Each subject was required to sit upright in a chair with Frankfort plane almost horizontal. The subject's head was not fixed. Procedure done on left side is explained.

A red coloured occlusal registration paper (12 µm) was placed on the occlusal surface of mandibular posterior teeth and the subject was asked to close his / her mandible in maximal intercuspation. Then the subject was requested to slide the mandible to the left side till the guidance teeth on the working side came in contact with each other and

as verbally direct by the observer. Then the red coloured occlusal registration paper (12 µm) was replaced with a black coloured occlusal registration paper and the subject was instructed to close his / her mandible in maximal intercuspal position.

The occlusal registration paper (12 µm) was removed and examined for presence of contacts. The dots in black represented the centric occlusal contacts while the lines in red represented the continuous contact from centric to lateral position. The position and number of lateral contacts were noted. To re-confirm the dynamic occlusal contacts 12 µm shim stock was placed on the occlusal surface of the last tooth (left side) on the examined side and then the subject was instructed to slide the mandible to the left side till the guidance teeth came in contact. A constant pulling force was applied on the shim stock to confirm the contact.

The teeth holding the occlusal registration strip were considered as the guidance tooth / teeth. The movement was performed by the subject without any help from the examiner. When the subject could not perform the movement voluntarily, he or she was asked to practice with the use of a hand mirror before beginning the occlusal recording procedure.

The same examination method was repeated on the opposite side. All recordings were performed by the same examiner and were repeated. In the case of differing results, the existence of occlusal contact was re-examined and verified.

Armamentarium.

Fig . 1

Armamentarium

Fig . 2

Fig 3 -Left working side – Canine Guidance Illustrated on a Typhodont model.

Black dots – ICP contacts, Red Line – Canine guidance.

Fig 4 - Right working side – Group function Illustrated on a Typhodont model.

Black dots – ICP contacts, Red Lines – Group function contacts.

Fig 5 - Left balancing side contact illustrated on a Typhodont model.

Black dots – ICP contacts, Red Lines – Group function contacts, Blue lines – Balancing side interference.

Lateral Contact recording with red articulating paper

Fig . 6

ICP Contacts recording with black articulating paper

Fig . 7

Left working side – Group Function.

Red lines – Group function Contacts, Blue spots – Balancing side interferences.

Fig . 8

Right working side – Canine guidance

Red line – Canine guidance, Black points – ICP contacts.

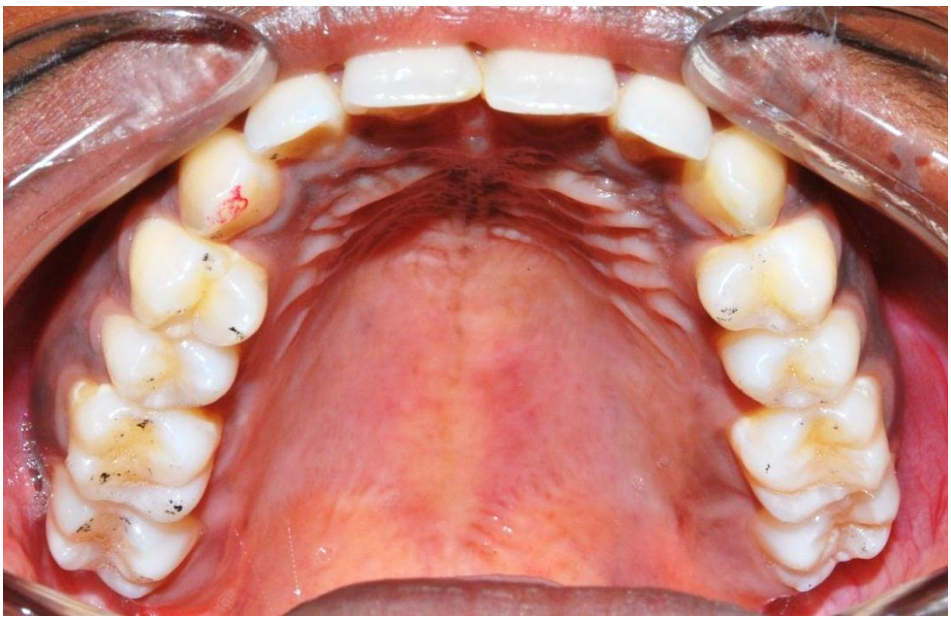


Fig . 9

Right Working Side - Canine Guidance

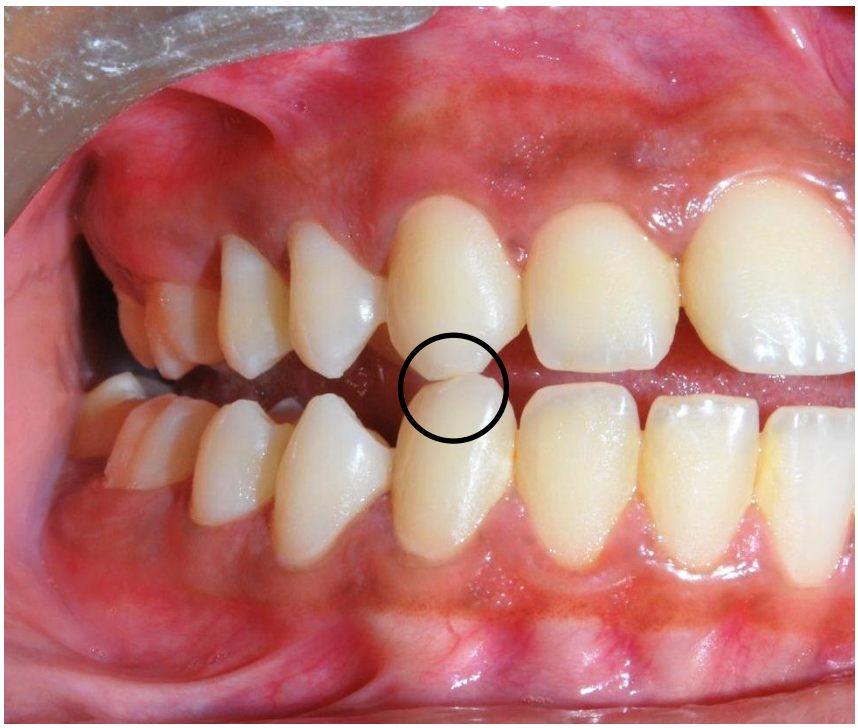


Fig . 10

Left working side - Canine Guidance

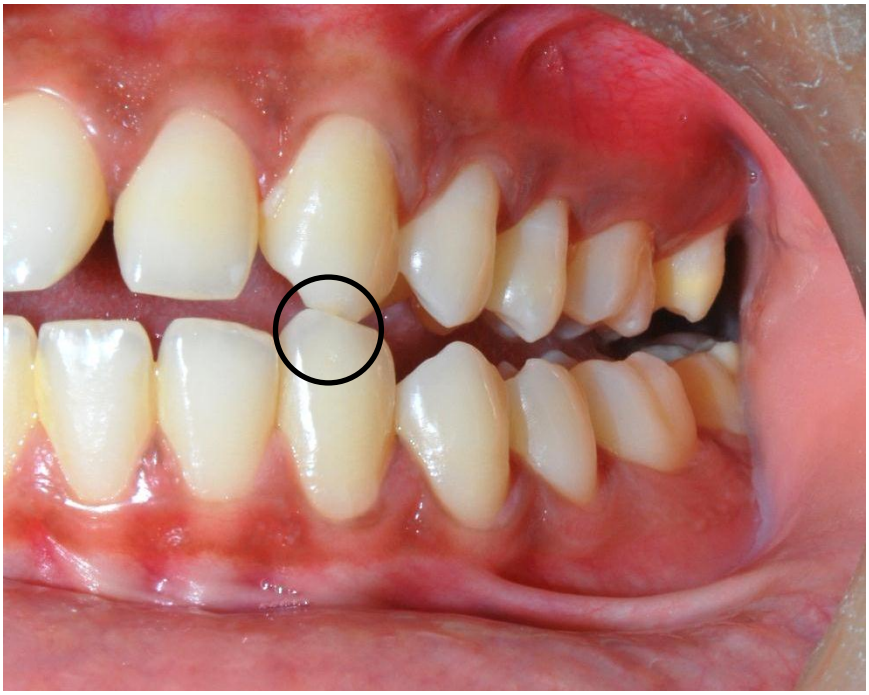


Fig . 11

Right working Side Group Function

Fig . 12

Left Working Side Group Function

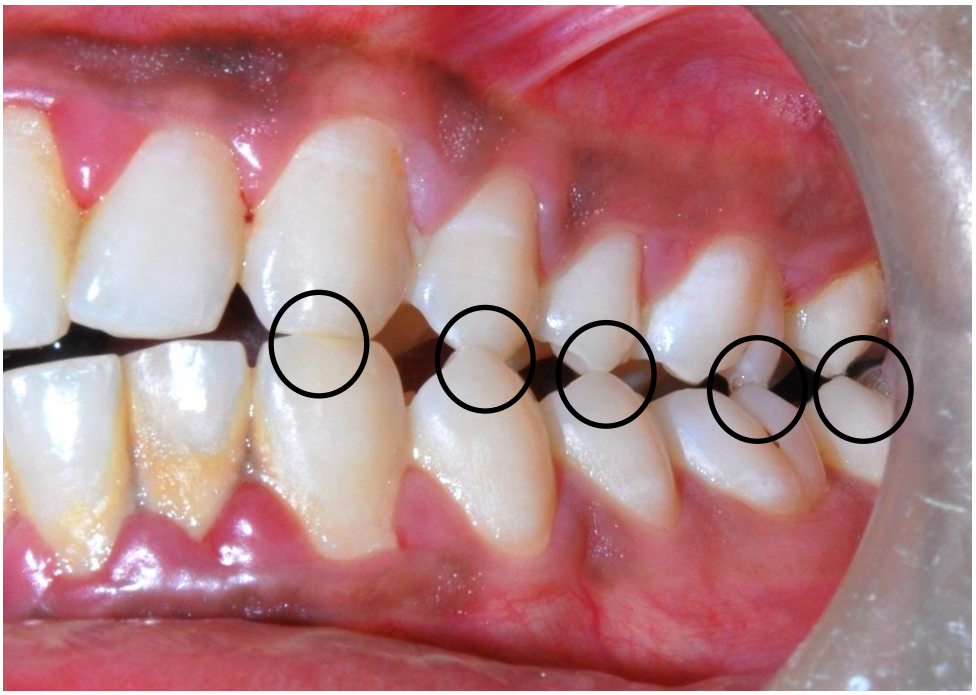


Fig . 13

Right Balancing side interference

Fig . 14

Left balancing side interference

Fig . 15

Survey chart.

Personal Details

Patient name Register no Date

Age Sex :

Marital status

Occupation

Community

Native place Present address

Dietary pattern

	Morning	Afternoon	Night
Rice			
Cereals			
Indian Bread			
Fruits			
Vegetables – Raw			
Vegetables - Cooked			
Meat			
Dairy Products			
Soft / Fast Food			

Examination

Movement		Contacts
Right lateral	Working	
	Balancing	
Left lateral	Working	
	Balancing	

Observation

Occlusal scheme	Right side	Left side
Group function		
Canine guidance		

5. Results

5. Result

The present study was conducted to determine the nature of anterior guidance during lateral mandibular excursive movements present among urban and tribal population. The occlusal schemes of groups T1, T2, T3 ,U1, U2, U3 were compared with each other in relation to their dietary habits .

Table 5.1 - shows the comparison of dynamic occlusal scheme present in the vegetarian tribal population on the right and left side during mandibular excursive movements.

Table 5.2 - shows the comparison of dynamic occlusal scheme present in the non-vegetarian tribal population on the right and left side during mandibular excursive movements.

Table 5.3 - shows the comparison of dynamic occlusal scheme present in the vegetarian urban population on the right and left side during mandibular excursive movements.

Table 5.4 - shows the comparison of dynamic occlusal scheme present in the non-vegetarian urban population on the right and left side during mandibular excursive movements.

Table 5.5 - shows the comparison of balancing side occlusal contacts present in urban population on the right and left side during mandibular excursive movements.

Table 5.1 – The comparison of dynamic occlusal scheme present in the vegetarian tribal population on the right and left side during mandibular excursive movements.

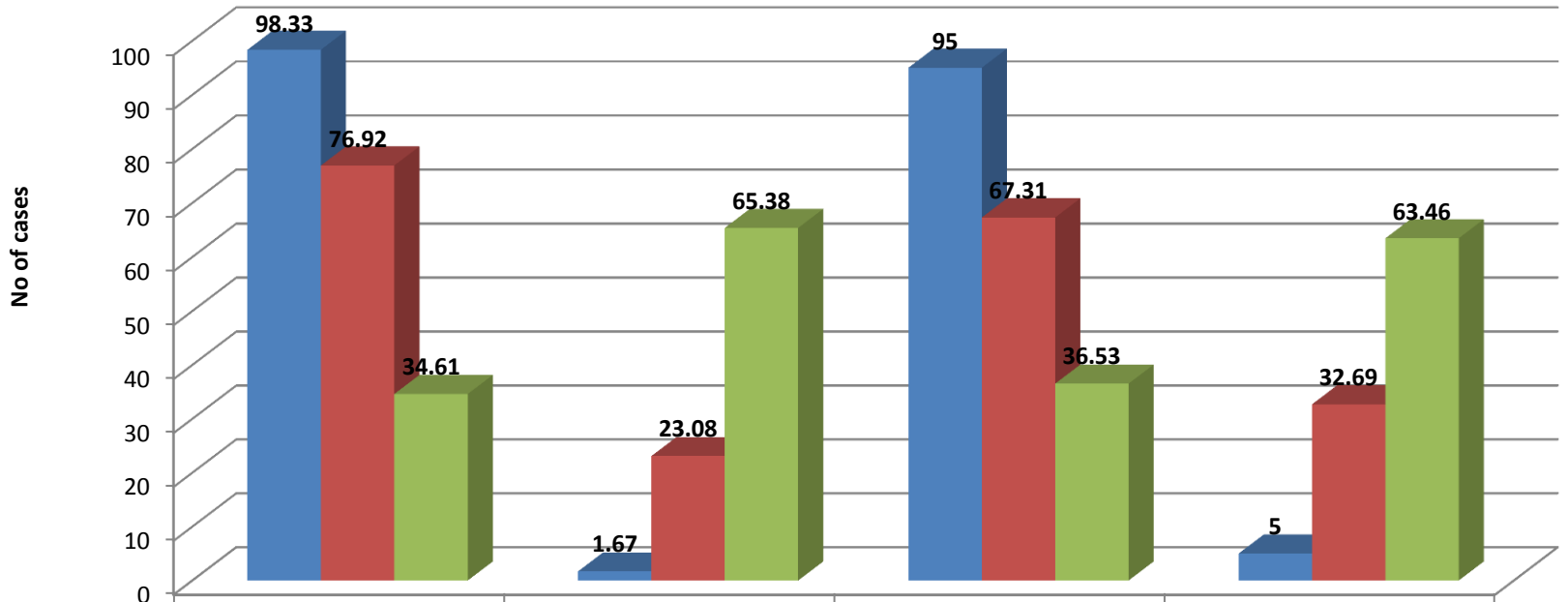
		VT1 (60)		VT2 (52)		VT 3 (52)	
		No. of cases	**%**	**No. of cases**	**%**	**No. of cases**	**%**
Right side occlusal scheme	**Canine guidance**	*59*	*98.33*	*40*	*76.92*	*18*	*34.61*
	Group Function	*1*	*1.67*	*12*	*23.08*	*34*	*65.38*
Left Side Occlusal Scheme	**Canine guidance**	*57*	*95*	*35*	*67.31*	*19*	*36.53*
	Group Function	*3*	*5*	*17*	*32.69*	*33*	*63.46*

This table shows the occlusal scheme during mandibular lateral excursive movements in the vegetarian tribal population.

In VT1 canine guidance was found in **98.33%** and **95%** of the population on the right and left side respectively. In VT2 canine guidance was found in **76.92%** and **67.31%** of the population on the right and left side respectively. In VT3 canine guidance was found in **34.61%** and **36.53%** of the population on the right and left side respectively.

There was **gradual transition from canine guidance to group function from VT1 to VT3.** Percentage of group function was found to be increasing from VT1 to VT3 in right and left sides. [(Right side VT1 – 1.67%, VT2 – 23.08%,V T3 - 65.38%), (Left side – VT1 – 5%, VT2 – 32.69 %, VT3 – 63.46%)].

Chart - 5.1 - Comparison of dynamic occlusal scheme present in the vegetarian tribal population in the right and left side during mandibular excursive movements.



	Right Side Canine Guidance	Right side Group Function	Left side Canine Guidance	Left Side Group Function
VT1 (17 to 28 Years)	98.33	1.67	95	5
VT2 (29 TO 40 Years)	76.92	23.08	67.31	32.69
VT3 (Above 40 Years)	34.61	65.38	36.53	63.46

Table 5.2 – The comparison of dynamic occlusal scheme present in the non-vegetarian tribal population on the right and left side during mandibular excursive movements.

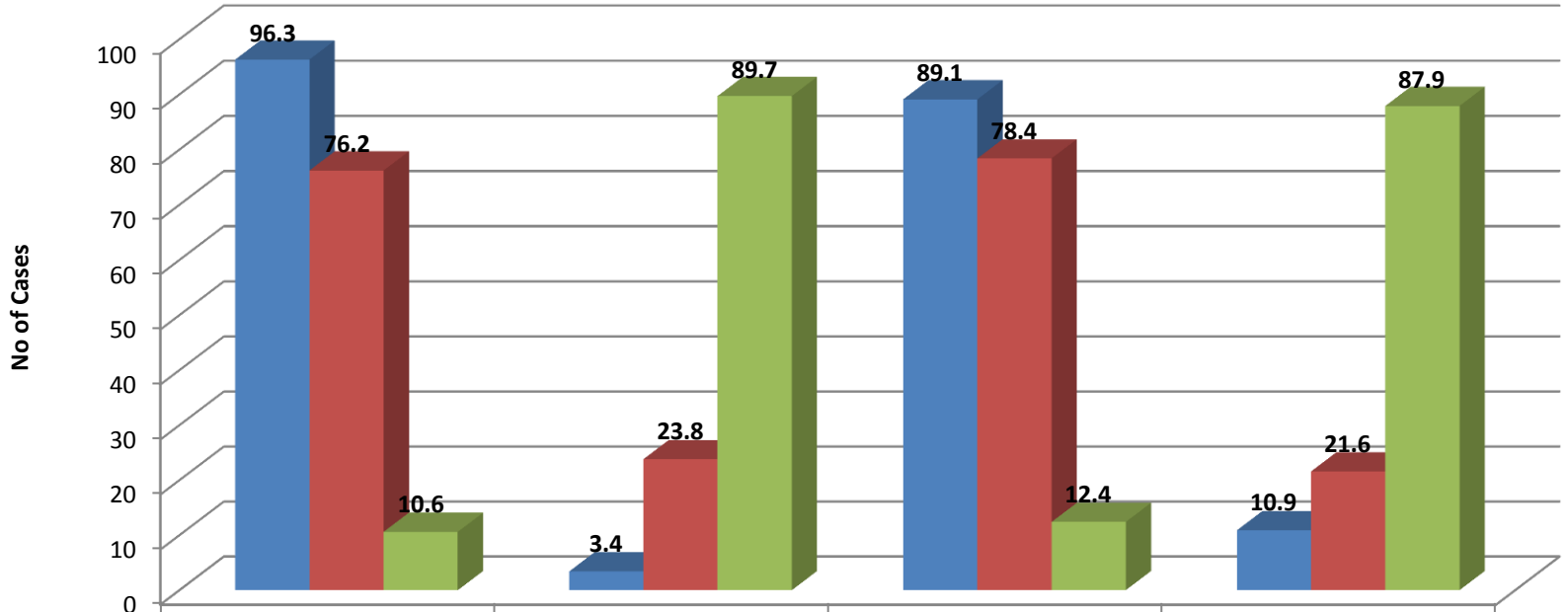
		NVT1 (83)		NVT2 (97)		NVT 3 (113)	
		No. of cases	%	No. of cases	%	No. of cases	%
Right side occlusal scheme	Canine guidance	*80*	*96.3*	*74*	*76.2*	*12*	*10.6*
	Group Function	*3*	*3.4*	*23*	*23.8*	*101*	*89.7*
Left Side Occlusal Scheme	Canine guidance	*74*	*89.1*	*76*	*78.4*	*14*	*12.4*
	Group Function	*9*	*10.9*	*21*	*21.6*	*99*	*87.9*

This table shows the occlusal scheme during mandibular lateral excursive movements in the non-vegetarian tribal population.

In NVT1 canine guidance was found in **96.3%** and **89.1%** of the population on the right and left side respectively. In NVT2 canine guidance was found in **76.2%** and **78.4%** of the population on the right and left side respectively. In NVT3 canine guidance was found in **10.6%** and **12.4%** of the population on the right and left side respectively.

There was **gradual transition from canine guidance to group function from NVT1 to NVT3.** Percentage of group function was found to be increasing from T1 to T3 in right and left sides. [(Right side NVT1 – 3.4%, NVT2 – 23.8%, NVT3 – 89.7%), (Left side –NV T1 – 10.9%, NVT2 – 21.6 %, NVT3 – 87.6%)].

Chart - 5. 2 - Comparison of dynamic occlusal scheme present in the non-vegetarian tribal population on the right and left side during mandibular excursive movements.



	Right Side Canine Guidance	Right side Group Function	Left side Canine Guidance	Left Side Group Function
NVT1 (17 to 28 Years)	96.3	3.4	89.1	10.9
NVT2 (29 TO 40 Years)	76.2	23.8	78.4	21.6
NVT3 (Above 40 Years)	10.6	89.7	12.4	87.9

Table 5.3 – The comparison of dynamic occlusal scheme present in vegetarian urban population on the right and left side during mandibular excursive movements.

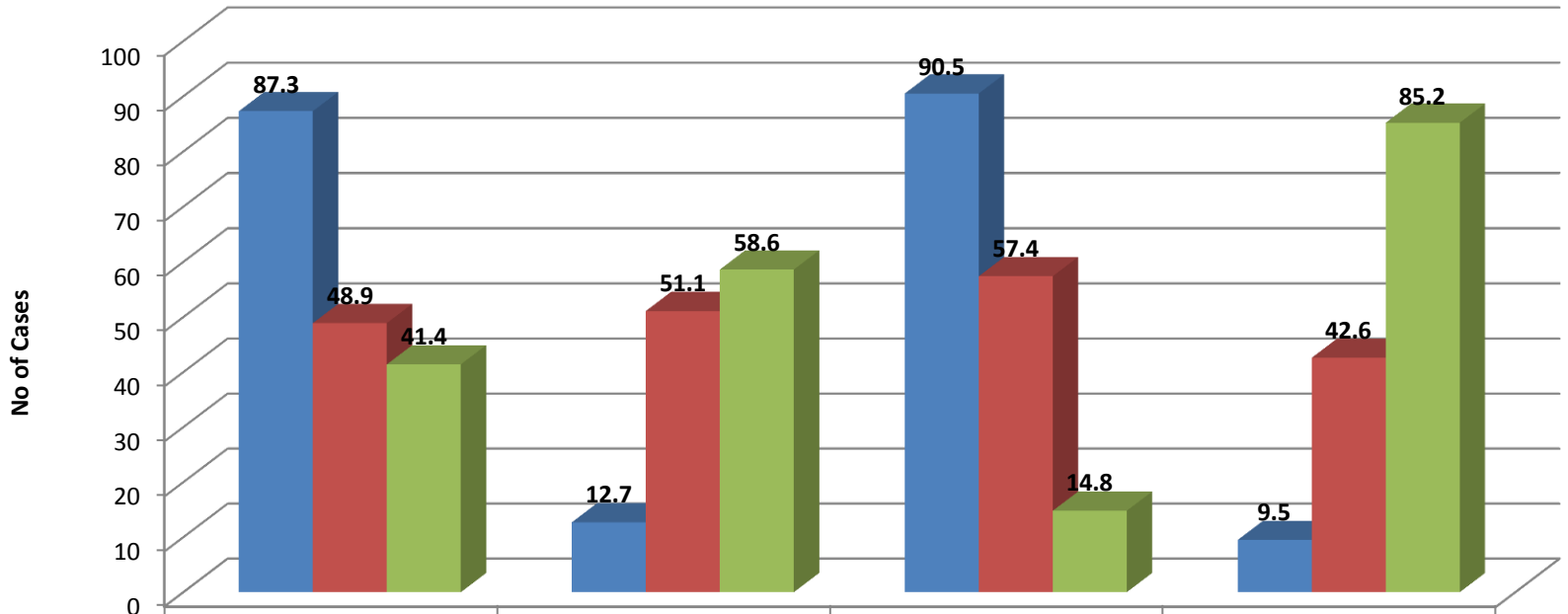
		VU1 (56)		VU2 (56)		VU 3 (56)	
		No. of cases	%	No. of cases	%	No. of cases	%
Right side occlusal scheme	Canine guidance	*47*	*83.9*	*25*	*44.6*	*10*	*17.8*
	Group Function	*9*	*16.1*	*31*	*55.4*	*46*	*82.2*
Left Side Occlusal Scheme	Canine guidance	*54*	*96.4*	*32*	*57.3*	*7*	*12.5*
	Group Function	*2*	*3.6*	*24*	*42.7*	*49*	*87.5*

This table shows the occlusal scheme during mandibular lateral excursive movements in the vegetarian urban population.

In VU1 canine guidance was found in **83.9%** and **96.4%** of the population on the right and left side respectively. In VU2 canine guidance was found in **44.6%** and **57.3%** of the population on the right and left side respectively. In VU3 canine guidance was found in **17.8%** and **12.5%** of the population on the right and left side respectively.

There was **gradual transition from canine guidance to group function from VU1 to VU3.** Percentage of group function was found to be increasing from U1 to U3 in right and left sides. [(Right side VU1 – 16.1%, VU2 – 55.4%, VU3 – 82.2%), (Left side –VU1 – 3.6%, VU2 – 42.7 %, VU3 – 87.5%)].

Chart - 5.4 - Comparison of dynamic occlusal scheme present in the non-vegetarian urban population on the right and left side during mandibular excursive movements.



	Right Side Canine Guidance	Right side Group Function	Left side Canine Guidance	Left Side Group Function
NVU1 (17 to 28 Years)	87.3	12.7	90.5	9.5
NVU2 (29 TO 40 Years)	48.9	51.1	57.4	42.6
NVU3 (Above 40 Years)	41.4	58.6	14.8	85.2

Table 5.4 – The comparison of dynamic occlusal scheme present in non-vegetarian urban population on the right and left side during mandibular excursive movements.

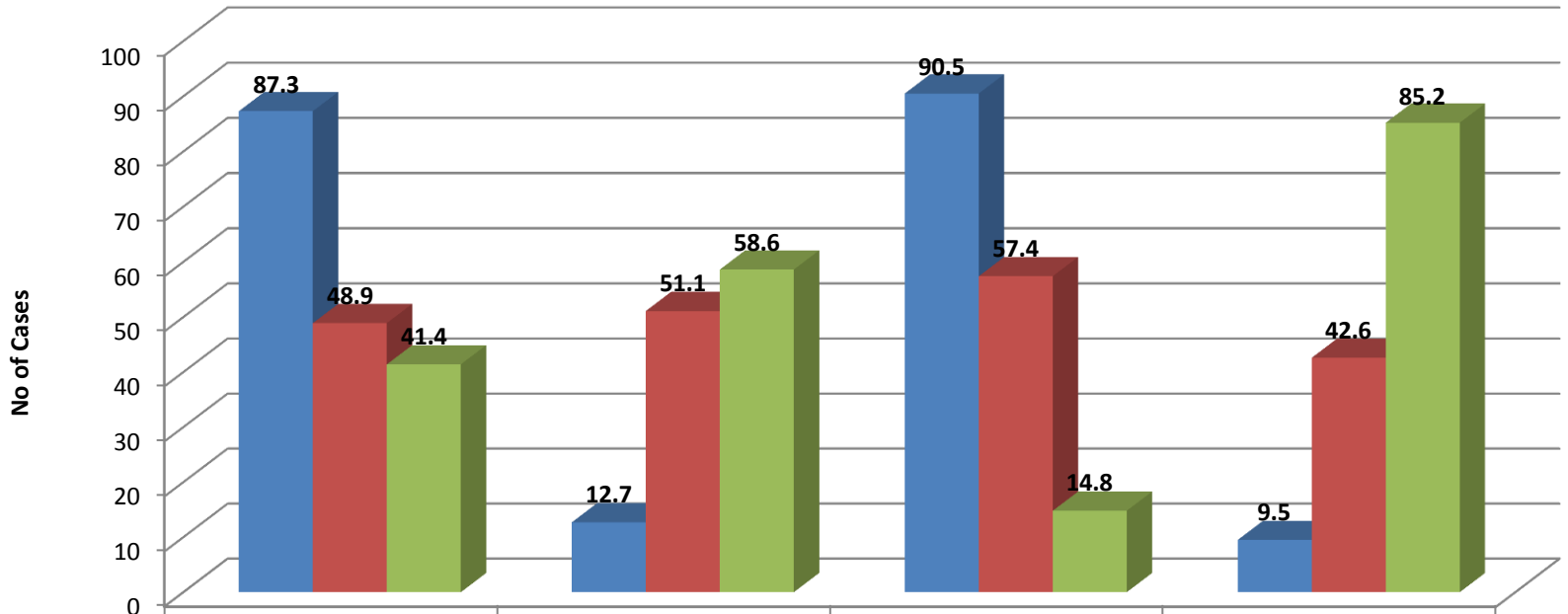
		NVU1 (94)		NVU2 (94)		NVU 3 (94)	
		No. of cases	%	No. of cases	%	No. of cases	%
Right side occlusal scheme	Canine guidance	*82*	*87.3*	*46*	*48.9*	*39*	*41.4*
	Group Function	*12*	*12.7*	*48*	*51.1*	*55*	*58.6*
Left Side Occlusal Scheme	Canine guidance	*85*	*90.5*	*54*	*57.4*	*14*	*14.8*
	Group Function	*9*	*9.5*	*40*	*42.6*	*80*	*85.2*

This table shows the occlusal scheme during mandibular lateral excursive movements in the non-vegetarian urban population.

In NVU1 canine guidance was found in **87.3%** and **90.5%** of the population on the right and left side respectively. In NVU2 canine guidance was found in **48.9%** and **57.4%** of the population on the right and left side respectively. In NVU3 canine guidance was found in **41.4%** and **14.8%** of the population on the right and left side respectively.

There was **gradual transition from canine guidance to group function from NVU1 to NVU3.** Percentage of group function was found to be increasing from NVU1 to NVU3 in right and left sides. [(Right side NVU1 – 12.7%, NVU2 – 1.1%, NVU3 – 58.6%), (Left side – NVU1 –9.5% NV,U2 – 42.6 %, NV U3 – 85.2%)].

Chart - 5.4 - Comparison of dynamic occlusal scheme present in the non-vegetarian urban population on the right and left side during mandibular excursive movements.



	Right Side Canine Guidance	Right side Group Function	Left side Canine Guidance	Left Side Group Function
NVU1 (17 to 28 Years)	87.3	12.7	90.5	9.5
NVU2 (29 TO 40 Years)	48.9	51.1	57.4	42.6
NVU3 (Above 40 Years)	41.4	58.6	14.8	85.2

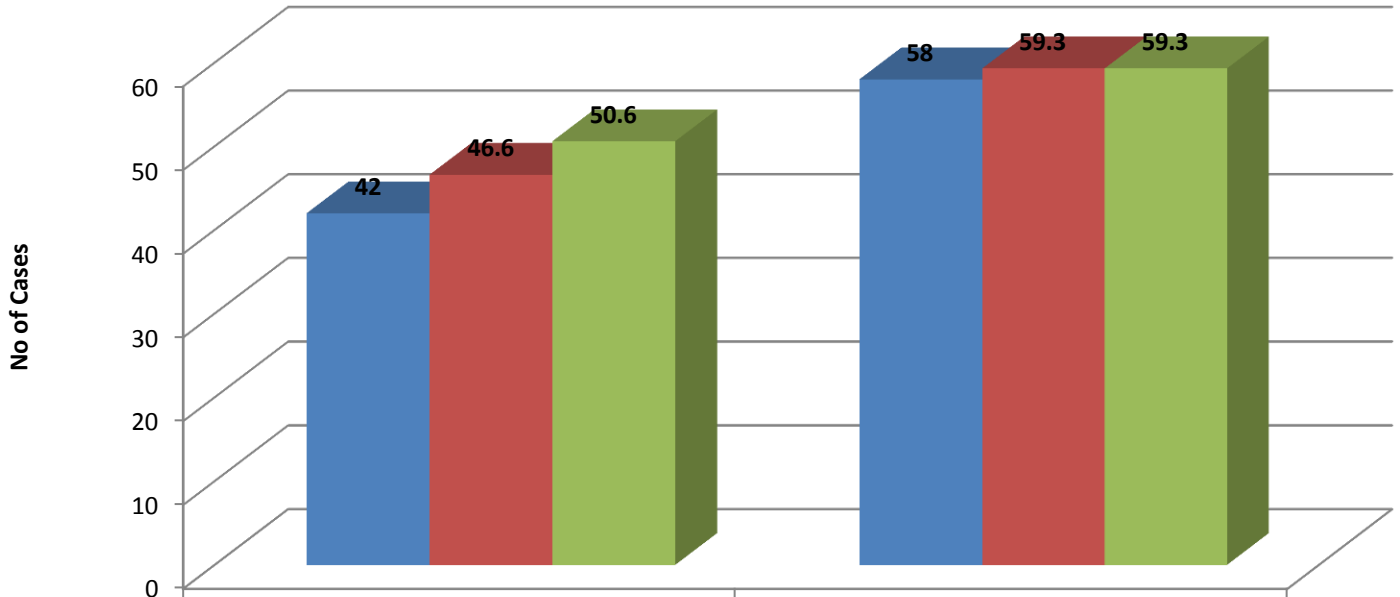
Table 5.5 – The comparison of balancing side occlusal contacts present in urban population on the right and left side during mandibular excursive movements.

	U1 (150)		U2 (150)		U 3 (150)	
	No. of cases	**%**	**No. of cases**	**%**	**No. of cases**	**%**
Right lateral movement	*63*	*42*	*70*	*46.6*	*76*	*50.6*
Left lateral movement	*87*	*58*	*89*	*59.3*	*89*	*59.3*

This table shows the changes in balancing side occlusal contacts during mandibular lateral excursive movements with age progression in urban population.

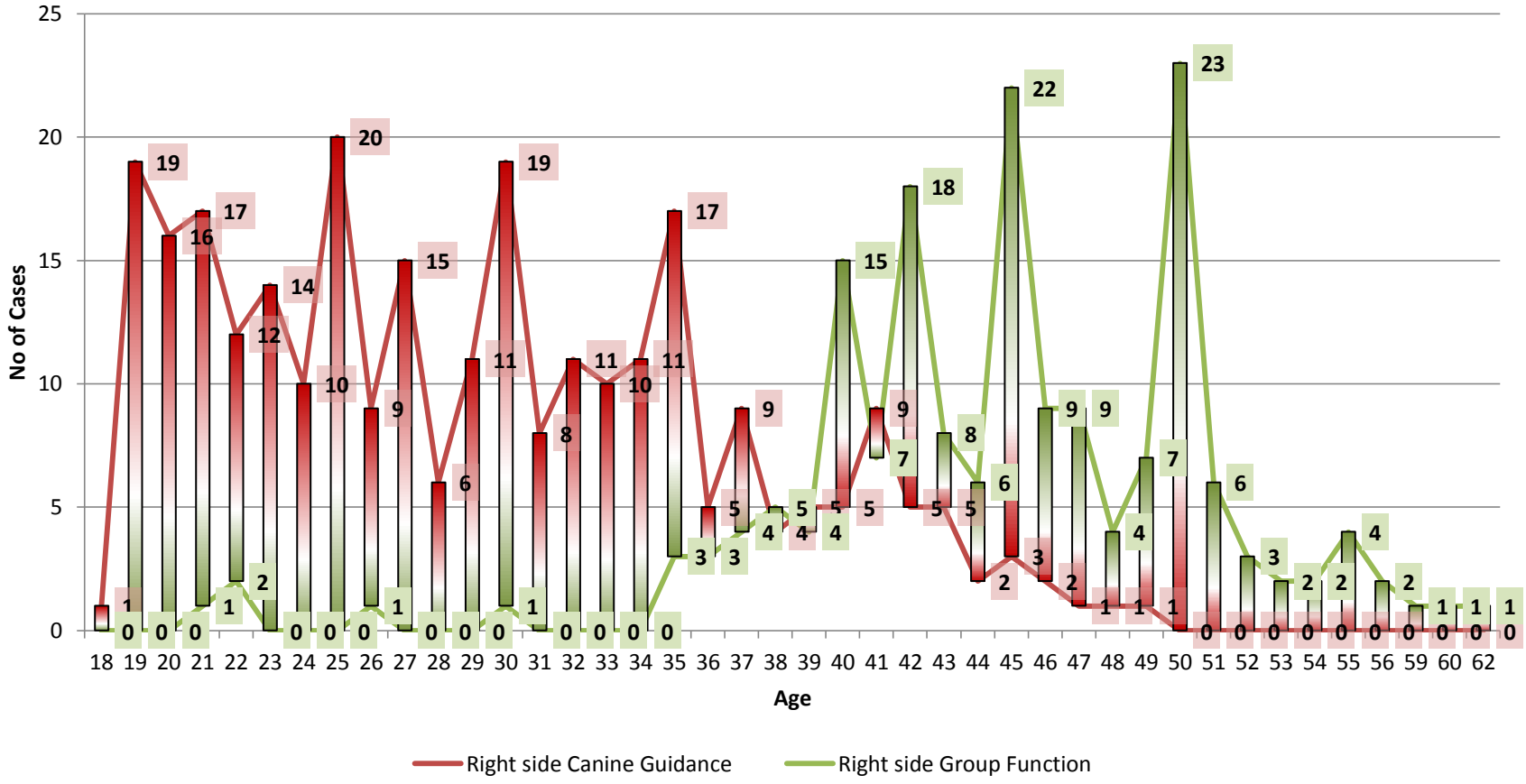
In U1 the balancing side contact was found to be **42 %** and **58 %** of population during right and left lateral movement respectively. In U2 the balancing side contact was found to be **46.6 %** and **40.7 %** of population during right and left lateral movement respectively. In U3 the balancing side contact was found to be **50.6%** and **59.3 %** of population during right and left lateral movement respectively.

Chart - 5.5 - Comparison of balancing side occlusal contacts present in urban population on the right and left side during mandibular excursive movements.



	Right Side balancing interference	Left side balancing interference
U1 (17 to 28 Years)	42	58
U2 (29 TO 40 Years)	46.6	59.3
U3 (Above 40 Years)	50.6	59.3

Chart 5.6 - Comparison of Right side Canine guidance and Group function among Tribal population



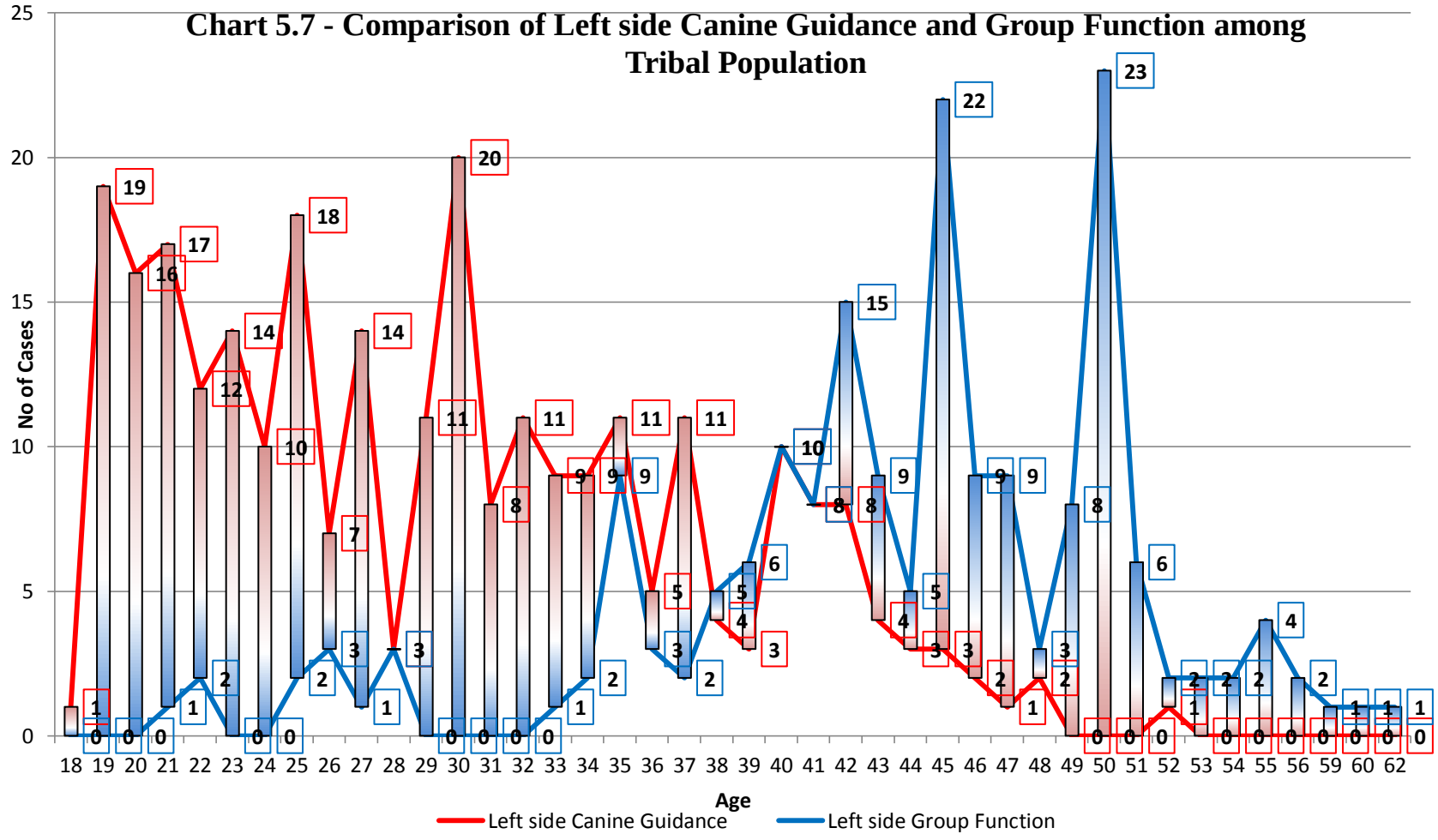


Chart 5.7 - Comparison of Left side Canine Guidance and Group Function among Tribal Population
No of Cases
Age
Left side Canine Guidance
Left side Group Function

Chart - 5.8 - Comparison of Right side Canine Guidance and Group Function in Urban Population

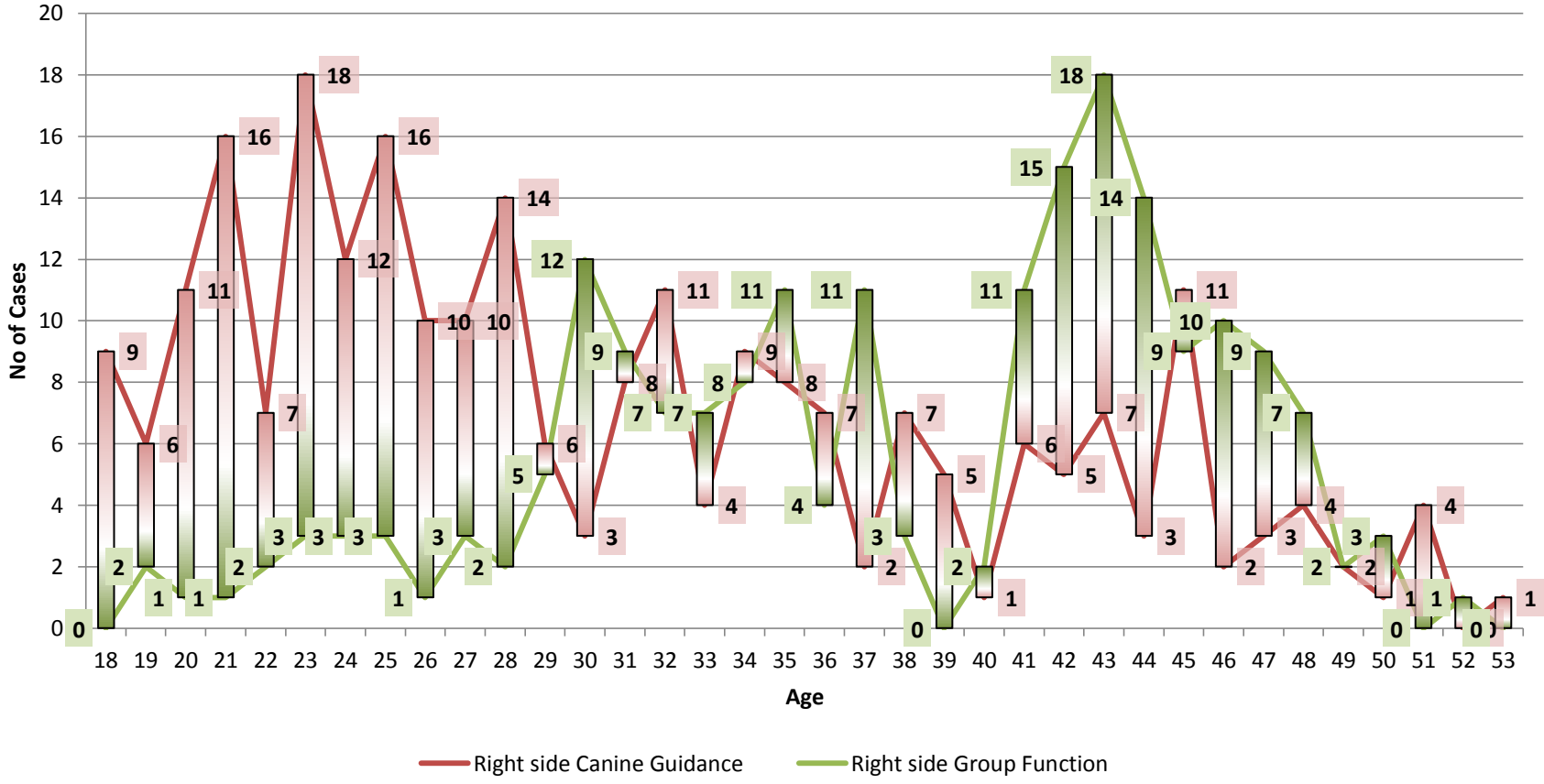
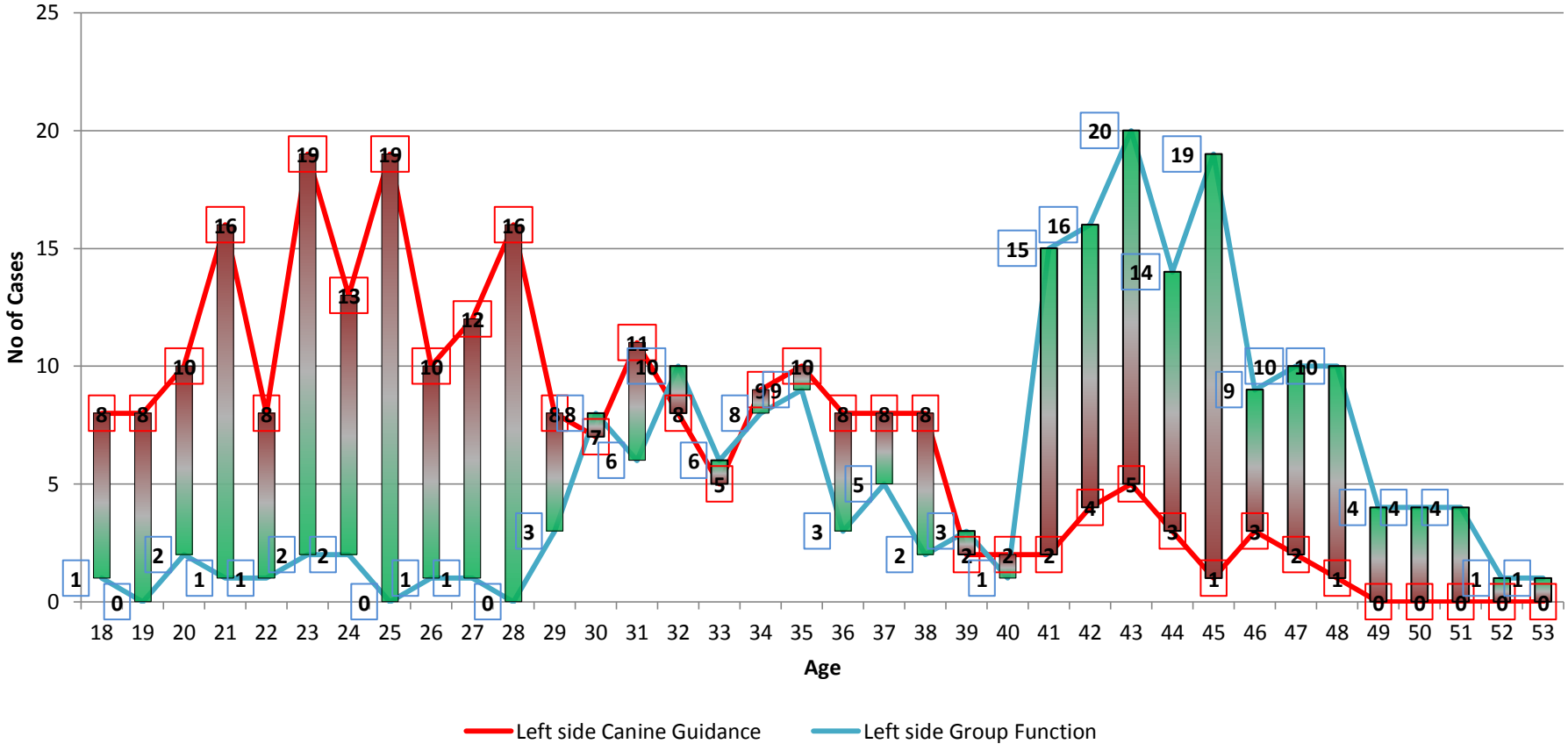


Chart - 5.9 - Comparison of Left side Canine Guidance and Group Function Among Urban Population



Statistical Analysis

The values obtained by percentage analysis in previous tables were statistically analyzed using Chi Squared test.

Chi Squared test:

A Chi-squared test or chi-square test or χ^2 test, is used to determine whether there is a significant difference between the theoretical expected frequency distribution and the observed expected frequency distribution in one or more categories in accordance with specific hypothesis.

1. Right and left side occlusal scheme in tribal population

H_0: *"There is no significant difference between Right side and Left side occlusal Schemes among Tribal Population during lateral mandibular excursive movements"* is tested against the alternative hypothesis that

H_1 : "*There is a significant difference between Right side and Left side occlusal Schemes among Tribal Population during lateral mandibular excursive movements".*

Table 5.6 Chi Square Test

			Right Side Occlusal scheme		Total
			Canine Guidance	Group Function	
Left side Occlusal scheme	Canine Guidance	Count	236	39	275
		Expected Count	170.3	104.7	275.0
	Group Function	Count	47	135	182
		Expected Count	112.7	69.3	182.0
Total		Count	283	174	457
		Expected Count	283.0	174.0	457.0

Table 5.7 – Chi square test results

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	167.186	0.000

Using **Chi-square Test** the null hypothesis

Since, the p-value was **less than α =0.05,** the null hypothesis was rejected at 5% level of significance. The alternative hypothesis was accepted and it was concluded that "*There is a significant difference between Right side and Left side occlusal Schemes among Tribal Population during lateral mandibular excursive movements".*

2. Dietary Pattern * Right Side Occlusal scheme

H_0: *"There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Right mandibular excursive movement"* is tested against the alternative hypothesis that

H_1 : "*There is a significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Right mandibular excursive movement".*

Table 5.8 Chi Square Test

			Right Side Occlusal scheme		Total
			Canine Guidance	Group Function	
Dietary pattern	Non-vegetarian	Count	166	127	293
		Expected Count	181.4	111.6	293.0
	Vegetarian	Count	117	47	164
		Expected Count	101.6	62.4	164.0
Total		Count	283	174	457
		Expected Count	283.0	174.0	457.0

Table 5.9 Chi Square test results.

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	9.619	0.002

Using **Chi-square Test** the null hypothesis

Since, the p-value was **less than α =0.05,** the null hypothesis was rejected at 5% level of significance . The alternative hypothesis was accepted and it was concluded that *"There is a significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Right mandibular excursive movement".*

3. Dietary Pattern * Left side Occlusal scheme

H_0: *"There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Left mandibular excursive movement"* is tested *against* the alternative hypothesis that

H_1 : "*There is a significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Left mandibular excursive movement".*

Table 5. 10 Chi Square Test

			Left side Occlusal scheme		Total
			Canine Guidance	Group Function	
Dietary Pattern	Non-vegetarian	Count	164	129	293
		Expected Count	176.3	116.7	293.0
	Vegetarian	Count	111	53	164
		Expected Count	98.7	65.3	164.0
Total		Count	275	182	457
		Expected Count	275.0	182.0	457.0

Chi-Square Test Result:

Table 5.11

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	6.017	0.014

Using **Chi-square Test** the null hypothesis

Since, the p-value was **greater than α =0.05,** the null hypothesis was accepted at 5% level of significance and it was concluded that "*There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Tribal Population in Left mandibular excursive movement".*

4. Right and left side occlusal scheme in Urban population

H_0: *"There is no significant difference between Right side and Left side occlusal Schemes among Urban Population during lateral mandibular excursive movements"* is tested against the alternative hypothesis that

H_1 : "*There is a significant difference between Right side and Left side occlusal Schemes among Urban Population during lateral mandibular excursive movements"*

Table 5.12 Chi Square Test

			Left side Occlusal scheme		Total
			Canine Guidance	Group Function	
Right Side Occlusal scheme	Canine Guidance	Count	166	83	249
		Expected Count	136.1	112.9	249.0
	Group Function	Count	80	121	201
		Expected Count	109.9	91.1	201.0
Total		Count	246	204	450
		Expected Count	246.0	204.0	450.0

Table 5.13 Chi Square test results.

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	32.392	0.000

Using **Chi-square Test** the null hypothesis

Since, the p-value was **less than α =0.05,** the null hypothesis was rejected at 5% level of significance. The alternative hypothesis was accepted and it was concluded that *"There is a significant difference between Right side and Left side occlusal Schemes among Urban Population during lateral mandibular excursive movements".*

5. Dietary Pattern * Right Side Occlusal scheme

H_0: *"There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Right mandibular excursive movement"* is tested against the alternative hypothesis that

H_1 : *"There is a significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Right mandibular excursive movement".*

Table 5.14 Chi Square Test

			Right Side Occlusal scheme		Total
			Canine Guidance	Group Function	
Dietary Pattern	Non-vegetarian	Count	167	115	282
		Expected Count	156.0	126.0	282.0
	Vegetarian	Count	82	86	168
		Expected Count	93.0	75.0	168.0
Total		Count	249	201	450
		Expected Count	249.0	201.0	450.0

Table 5.15 Chi Square test results

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	4.616	0.032

Using **Chi-square Test** the null hypothesis

Since, the p-value was **greater than α =0.05,** the null hypothesis was accepted at 5% level of significance and it was concluded that "*There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Right mandibular excursive movement".*

Dietary Pattern * Left side Occlusal scheme

H_0: *"There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Left mandibular excursive movement"* is tested *against* the alternative hypothesis that

H_1 : "*There is a significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Left mandibular excursive movement".*

Table 5.16 Chi Square Test

			Left side Occlusal scheme		Total
			Canine Guidance	Group Function	
Dietary Pattern	Non-vegetarian	Count	153	129	282
		Expected Count	154.2	127.8	282.0
	Vegetarian	Count	93	75	168
		Expected Count	91.8	76.2	168.0
Total		Count	246	204	450
		Expected Count	246.0	204.0	450.0

Table 5. 17 Chi Square test results

Level of Significance	Degrees of freedom	Chi-square value	p-value (2-sided)
5%	1	0.052	0.820

Using **Chi-square Test** the null hypothesis

Since, the p-value was **greater than α =0.05,** the null hypothesis was accepted at 5% level of significance and it was concluded that "*There is no significant difference between the occlusal schemes of Vegetarian and Non-vegetarian Urban Population in Left mandibular excursive movement".*

6. Discussion

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The term *"Occlusion"* simply means contacts between the teeth. This can be further refined by defining those contacts between the teeth when the mandible is stationary as in static occlusion, and those contacts between the teeth when the mandible is moving as in dynamic occlusion.

Dynamic occlusion refers to the occlusal contacts that are made whilst the mandible is moving relative to the maxilla. The mandible is moved by the muscles of mastication and the pathways along which it moves are determined not only by these muscles but also by two guidance systems.

When the head of the condyle moves downwards and forwards the mandible moves along a guidance pathway which is determined by the intra-articular disc and the articulatory surfaces of the glenoid fossa, all of which is enclosed in the temporomandibular joint capsule. So the temporomandibular joints form the posterior guidance system of the mandible.

Teeth contacting during protrusive or lateral movement of the mandible form the anterior guidance system of the mandible. This anterior guidance can be provided by whichever teeth contacting during eccentric movements of the mandible. For example, patients with a severe anterior open bite would still always have anterior guidance of their mandible, it could, for instance be on the second molars.

Occlusal contacts occurring during voluntary mandibular excursive movements vary in regard to location and number. Several authors have studied

the prevalence of various types of anterior guidance in natural permanent dentition. **Schuyler**[68] has emphasized the importance of anterior guidance over condylar guidance. According to him anterior guidance was controlled by unyielding consistent tooth–tooth contact, whereas condylar guidance varied due to flexibility of the joint, so unfavourable incisal guidance may result in abnormal functional movements of the condyles.

Anterior guidance, which is essential for *esthetics, phonetics* and *mastication*, can be further categorized as group function or canine guidance. Although these occlusal guidance systems are clearly divergent in both philosophy and technique, they both appear to have been evolved from common roots of balanced occlusion. Group function appears to be the direct descendent of the balanced occlusion theory[19].

Schuyler [65,66] enlightened harmful effects of balanced occlusal contacts in natural dentition. He observed that even though these contacts were essential for stability of complete dentures, they were traumatic to the natural dentition, causing temporomandibular joint (TMJ) dysfunction, periodontal involvement or excessive wear. As a result of research conducted by **Schuyler**, **Muleman**[52,] **Glickman**[10b] balanced occlusion was replaced with unilateral balanced occlusion or group function in the rehabilitation of natural dentition.

This philosophy advocated by **Schuyler** (1953) was incorporated with those of **Pankey** and **Mann** to form a concept of treatment known as the **Pankey-Mann-Schuyler** philosophy for complete occlusal rehabilitation[68,49] Since its conception, the objective of this philosophy has been to achieve

the principles of occlusion developed by **Schuyler**, which include maximum contact of the teeth in centric relation; simultaneous contact of the anterior and posterior teeth on the working side during lateral excursions; posterior disclusion in protrusion; and no contacts on the balancing side teeth during lateral excursions. These goals were sequentially accomplished by first emphasizing examination, diagnosis, and treatment planning.

The concept of canine guidance or canine rise was suggested by **D'Amico**[19] (1960), Scaife and **Holt**[63] .Canine guidance is the disocclusion of all the teeth by the canines in lateral excursions.

Stuart and **Stallard**[58] also observed this phenomenon and developed anterior guidance as part of their gnathological concept in mutually protected occlusion. Ironically, **Stuart**, **Stallard**[76] and **McCollum**[51], were staunch advocates of balanced occlusion. They attributed the failure of balanced occlusion in natural dentition to the trauma caused by multitudinous, simultaneous contacts that resulted in occlusal wear, periodontal involvement, or TMJ dysfunction.

D'Amico[18] studied the function of the canines from the anthropoid apes to modern man. He theorized that the overlapping of the canines was originally displayed in the great apes due to their nonabrasive diet. As early man's diet and environment changed, so did the form and function of the canines. Occlusal wear caused a progressive reduction of vertical relation, edge to-edge occlusion, and a wide range of lateral and

protrusive movements. With the advent of a soft diet in modern world there was a gradual change back to the overlapping relationship of the canines. **D'Amico** deduced from this "the canines have been casualties of function rather than casualties of evolution[18].

Another tenet of *D'Amico's theory*[17] was that the canines acted as *"nature's stress breakers"* to protect the periodontium and supporting structures from lateral stress during eccentric movements. Upon functional contact by the canines, the periodontal proprioceptive impulses are transmitted to the mesencephalic root of the fifth cranial nerve, which controls the motor impulses to the musculature. The resultant involuntary reaction relaxes the muscles and thus decreases the adverse effects of the lateral force on the periodontium. **D'Amico** concluded that, if all natural teeth had this "involuntary physiologic factor," balanced occlusion could be applied without fear of periodontal or restorative failure. The canines, due to their crown-root ratio, strategic location away from the fulcrum, and stress-breaking capabilities, were the most likely candidates for this function. Hence the term *"canine disclusion"* was formulated.

The research conducted by **Shaw**[72], **Stuart**[76] and **Stallard**, and by **D'Amico**[18] is incorporated into the present gnathological concept[36]. Proponents of this concept believe that each tooth has a specialized function. In order for the stomatognathic system to function, teeth must work independently of each other and so definite contour of each tooth in Full mouth rehabilitation is essential. The anterior teeth should be designed to

provide disocclusion of posterior teeth during eccentric movements and posterior teeth should be designed to bear maximum load in centric position.

A major function of the anterior guidance, as explained above is immediate disclusion of the posterior teeth the moment the mandible moves from centric relation. This is the only occlusal scheme that permits a peaceful coordination of the masticatory musculature. It also prevents excessive wear on the posterior teeth, and actually reduces the occlusal forces loaded on the anterior teeth. Thus, the success or failure of occlusal reconstruction hinges on precisely establishing the correct anterior guidance.

Schuyler[64] **Weinberg LA**[80], **Alexander PC** [6], **Beyron HL12** viewed functional occlusal wear as a compensatory adaptive change that distributed stress to create a normal functional relationship. **Linghorne**[47], **Forde**[24], **Gregory WK**[30], **Williams CH**[83] had suggested that functional occlusal wear was natural and beneficial.

The functional occlusal wear depends upon various factors which includes existing occlusal scheme, occlusal prematurities, consistency and type of food intaken, stress, parafunctional habits, etc. Various authors have suggested the transition of canine guidance to group function[36,72]. The group function philosophy appears to be one of physiological wear.

Understanding the type of anterior guidance present and the factors influencing it, is essential in planning prosthodontic treatment.

This study was conducted to determine the type of anterior guidance present in natural permanent dentition in lateral mandibular excursive

movements among the tribal and urban population. There is greater variation in the dietary pattern and the manner in which the food is processed between the tribal and urban population. So these two groups were selected to determine the relation between diet and dynamic occlusal scheme.

Total of 900 cases were recorded with 450 subjects in each group (T, U). The groups (T, U) were divided into three subgroups based on their age (T1, T2, T3 and U1, U2, U3). These groups were further categorized into vegetarians (V) and non-vegetarians (NV).

- **Group T – Tribal Population 450 subjects**
    - *Subgroup* T 1 – Age 17 to 28 years – 150 subjects.
        - Class VT1 , Class NVT1
    - *Subgroup* T 2 – Age 29 to 40 years – 150 subjects.
        - Class VT2 , Class NVT2
    - *Subgroup* T 3 – Age above 41 years. – 150 subjects.
        - Class VT3 , Class NVT3
- **Group U – Urban Population 450 subjects**
    - *Subgroup* U 1 - Age 17 to 28 years– 150 subjects.
        - Class VU1 , Class NVU1
    - *Subgroup* U 2 - Age 29 to 40 years– 150 subjects.
        - Class VU2 , Class NVU2
    - *Subgroup* U3 - Age above 41 years. – 150 subjects.
        - Class VU3 , Class NVU3

Occlusal examination was performed and the data was recorded. Data obtained were statically analysed **(Chi squared test)** and the results were tabulated.

In this study the occlusal examination of the tribal population with raw, coarse and fibrous dietary habit revealed the following clinical features.

- Canine guidance occlusion was found to be more in younger age groups (T1- 17-28 years). Statically a positive correlation was obtained between dynamic occlusal scheme and age. With progressing age, the prevalence of group function was increased both in T2 and T3. (Table 5.1 , 5.2)
- There was a significant difference between the right side and left side occlusal schemes (p=0.000) in both vegetarians and non-vegetarians. Both canine guidance and group occlusion was found to be present in the same individual. (Table 5.6, 5.7, 5.8, 5.9)
- Incidence of canine protected occlusion was more among vegetarians in both right and left side (Right side – 71.3 % , left side – 67.68 %). On the other hand both canine guided and group function occlusion was found to be equally distributed among non-vegetarians.
- The prevalence of balancing side contacts were less.

In this study the occlusal examination of the urban population with softer dietary habits showed the following clinical features.

- Canine guidance occlusion was found to be more in younger age groups (U1-17-28 years). With progressing age, the prevalence of group function increased and dominated especially in the older age groups (U3-

above 40 years of age). But statistically no positive correlation could be obtained between age and dynamic occlusal scheme. (Table 5.3, Chart 5.8, 5.9).

- In group U there was a significant difference (p=0.000) between the right side and left side occlusal scheme. (Table 5.12, 5.13).
- No particular occlusal scheme dominated on the right and left side of vegetarian and non-vegetarian urban population.
- The most striking feature noticed in urban population was the high frequency of balancing side contacts. These contacts were noticed more in the aged population (U3- above 40 years) and they were asymptomatic. (Table 5.5)

Comparison of occlusal examinations of tribal and urban population.

- The prevalence of canine guidance occlusal scheme was greater in urban population when compared to tribal population.
- The dynamic occlusal scheme was found to be in correlation with age in tribal population whereas there was overlapping of occlusal schemes in urban population. The dominant occlusal scheme was clearly demarcated in tribal population (Canine guidance was common in T1 and group function was common in T2 and T3). But in Urban population canine guidance was common in U1 and group function in U3. Dominant occlusal scheme was not well demarcated in U2. (Chart 5.6, 5.7, 5.8, 5.9).

A literature search revealed that epidemiologic studies on natural dynamic occlusions were mainly performed in younger age groups[7,21,32,33,61,63,77,81] It was indicated that canine-protected occlusion was frequently seen in children and adolescents, while in young adults ,group function occlusion was found. The results of this study coincided with the above mentioned findings. But the study by **Weinberg**[80] in 1964 in a population of 200 patients revealed that 81% of his subjects presented group function and the remaining 19% had canine protection. **Gesch** et al[3] in a large population based study, performed on 4,310 adults (aged 20 to 81 years) found that the distribution of dynamic occlusion schemes may change with age. In the above studies the relation between the dietary habit and age to occlusal scheme has not been clearly demarcated.[80, 3.]

- In this study the transition of occlusal schemes occurred at a much earlier age group in tribal population, when compared to urban population. The decrease in percentage of canine guidance, with increasing age may be due to occlusal wear of teeth (i.e. attrition, abrasion or erosion) especially of canines and posterior teeth in the older age group. Such occlusal wear of teeth with age is possible and is supported by data from professional literature.[31, 56, 60] The theory by **McAdam** about dynamic transformation of canine-protected occlusion into group function occlusion due to tooth wear was indirectly confirmed in the present study. The difference in type and consistency of food intake may be one of the reasons for this phenomenon
- Also in this study, there was a considerable amount of balancing contacts present in urban population and they had a positive correlation with

age. The balancing side contacts in tribal population were significantly less. The distinct variation in balancing side contacts between tribal and urban population may be due to various factors.

Although current evidence does not exist to relate tooth contacts to type of food intake it is quite likely that hard foods (such as raw fruits and vegetables) and fibrous or dry meat taken by the tribal population could have effectively eliminated occlusal interferences. The soft dietary intake of urban population is not conducive to adaptive tooth wear and this could be the reason for the presence of noticeable balancing occlusal contacts.

A number of other studies involving natural dentition also found occlusal relationships in which non-working side contacts were present (**De Laat** and **van Steerberger**, 1985, **Droukas** et.al, 1985**, Egermark-Erickson** et.al, 1987, **Yafffe** and **Ehrlich**, 1987, **Ingervall** et.al 1991, **Tipton** and **Rinchuse**, 1991, **Takai et.al**, 1993).

Carlsson and **Droukas** reviewed and reported that mere presence of occlusal interference is not the etiology of bruxism and functional disturbances. This is confirmed in the present study and these contacts shall not to be considered as an indication for occlusal equilibration, until it remains asymptomatic.

Further investigations are needed for a comprehensive explanation of the abovementioned problems. Especially, the occurrence of particular natural dynamic occlusions should be analysed in relation to periodontal diseases and bruxism. Also, the prevalence of TMDs should be investigated in relation to

dynamic occlusion schemes, because many researchers indicated some relationship between TMD and occlusion.[82,33,48] Data from such designed studies may have great value in establishing the most appropriate dynamic occlusion pattern to maintain the health of the stomatognathic system.

7. Summary and Conclusion

7. Summary and Conclusion

Dietary pattern can play a significant role in determining the occlusal scheme during mandibular lateral excursive movements.[82,33] The aim of the study was to determine the nature of anterior guidance present among tribal and urban population, in and around Coimbatore, Tamil Nadu, India.

The study population was selected based on dietary pattern. The dietary pattern was determined with the help of questionnaires. From the survey, tribal population with fibrous dietary habit was selected from the villages of Masinagudi near Ooty and from Thimbam forest near Sathiyamangalam. Urban population with soft dietary habit was selected from the city of Coimbatore.

Within the limitations of this study the following conclusions can be drawn.

1. In general, canine protected occlusion was more common in younger patients and Group function in older patients, in both Tribal and Urban population.
2. The dominant occlusal scheme was clearly demarcated in each age group of tribal population studied. The reason for this can be attributed to functional occlusal wear as a result of intake of coarse, fibrous food.
3. No positive correlation between age and dynamic occlusal scheme was found in Urban population. There was overlapping of occlusal schemes in Urban population (Especially U2 group). Reduced functional occlusal wear due to soft dietary habit could be the reason for this finding.

4. Significant number of balancing side contacts were noticed in Urban population. Difference in occlusal wear can be stated as the reason for the above finding. In spite of the presence of these balancing side interferences, patients were asymptomatic. This emphasises the part that mere presence of occlusal prematurity is not an indication for occlusal equilibration.

Influence of dietary pattern on dynamic occlusal scheme is given the least importance during Prosthodontic rehabilitation. Considering the above factors, dietary pattern should be considered as one of the main factors in determining the occlusal scheme and hence utmost consideration should be given to it.

The success of any dental restorations should not be measured by immediate outcomes, such as patient comfort and appearance, but also by long term survival and stability of definitive restorations. Patients' comfort should be coincident with mechanical precision. Controlling the forces on restorations is one of the key factors in their longevity. In addition, the occlusal scheme should be "therapeutic" in that, it should not create an environment favourable for self-destruction of teeth restoration surfaces and/or mucoskeletal problems.

Detailed dietary history should be noted during the initial phase of oral rehabilitation, so that it can be considered in generating the occlusal scheme for functional harmony and longevity.

The canine protected occlusal scheme seems to be more suitable for Orthodontic and Prosthodontic rehabilitation planned in younger patients, while

the Group function occlusion may be a suitable pattern for Prosthodontic rehabilitation planned in middle age and older patients, especially for people with coarse dietary habits.

However, the presence of parafunctional habits, unilateral chewing habit, psychological factors, periodontal diseases, temporomandibular disorders as a factor in determining the occlusal scheme, was not considered in this study. These factors influence the occlusal scheme in a gradual manner. Unfortunately the present study is a cross-sectional study which does not allow the investigation of such longitudinal process in the stomatognathic system. Further investigations are needed in the above mentioned aspect to allow a better understanding of this phenomenon.

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8. Bibliography:

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9. Annexure.

Tribal Vegetarian Population (VT1) (17 to 28 Years)						
S. No	**Age**	**Sex**	**Left Working side occlusal scheme**	**Right balancing side contact**	**Right working side occlusal contact**	**Left balancing side contact**
1	19	Male	CG	NI	CG	NI
2	19	Male	CG	NI	CG	NI
3	19	Male	CG	NI	CG	NI
4	19	Male	CG	NI	CG	NI
5	19	Male	CG	NI	CG	NI
6	19	Male	CG	NI	CG	NI
7	20	Male	CG	NI	CG	NI
8	20	Male	CG	NI	CG	NI
9	20	Male	CG	NI	CG	NI
10	20	Male	CG	NI	CG	NI
11	21	Male	CG	NI	CG	NI
12	21	Male	CG	NI	CG	NI
13	21	Male	CG	NI	CG	NI
14	21	Male	CG	NI	CG	NI
15	21	Male	CG	NI	CG	NI
16	21	Male	GF	NI	CG	NI
17	21	Male	CG	NI	CG	NI
18	21	Male	CG	NI	CG	NI
19	22	Male	CG	NI	CG	NI
20	22	Male	CG	NI	CG	NI
21	22	Male	CG	NI	CG	NI
22	22	Male	CG	NI	CG	NI
23	22	Male	GF	NI	GF	NI
24	22	Male	GF	NI	GF	NI
25	22	Male	CG	NI	CG	NI
26	22	Male	CG	NI	CG	NI
27	22	Male	CG	NI	CG	NI
28	23	Male	CG	NI	CG	NI
29	23	Male	CG	NI	CG	NI
30	23	Male	CG	NI	CG	NI
31	23	Male	CG	NI	CG	NI
32	23	Male	CG	NI	CG	NI
33	24	Male	CG	NI	CG	NI
34	24	Male	CG	I	CG	NI
35	24	Male	CG	NI	CG	NI
36	24	Male	CG	NI	CG	NI
37	24	Male	CG	NI	CG	NI
38	25	Male	CG	NI	CG	NI
39	25	Male	CG	NI	CG	NI
40	25	Male	CG	NI	CG	NI
41	25	Male	CG	NI	GF	NI
42	25	Male	CG	NI	CG	NI
43	25	Male	CG	NI	CG	NI
44	26	Male	CG	NI	GF	NI
45	26	Male	CG	NI	GF	NI
46	26	Male	CG	NI	CG	NI
47	26	Male	CG	NI	CG	NI
48	27	Male	CG	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
49	27	Male	CG	NI	CG	NI
50	27	Male	CG	NI	GF	NI
51	27	Male	CG	NI	CG	NI
52	27	Male	CG	NI	CG	NI
53	27	Male	CG	NI	CG	NI
54	28	Male	CG	NI	GF	NI
55	28	Male	CG	NI	CG	NI
56	28	Male	CG	NI	CG	NI

Tribal Non-Vegetarian Population NVT1 (17 to 28 years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	18	Female	CG	NI	CG	NI
2	19	Male	CG	NI	CG	NI
3	19	Male	CG	NI	CG	NI
4	19	Male	CG	NI	CG	NI
5	19	Male	CG	NI	CG	NI
6	19	Male	CG	NI	CG	NI
7	19	Male	CG	NI	CG	NI
8	19	Female	CG	NI	CG	NI
9	19	Female	CG	NI	CG	NI
10	19	Female	CG	NI	CG	NI
11	19	Female	CG	NI	CG	NI
12	19	Female	CG	NI	CG	NI
13	19	Female	CG	NI	CG	NI
14	19	Female	CG	NI	CG	NI
15	20	Male	CG	NI	CG	NI
16	20	Male	CG	NI	CG	NI
17	20	Male	CG	NI	CG	NI
18	20	Female	CG	NI	CG	NI
19	20	Female	CG	NI	CG	NI
20	20	Female	CG	NI	CG	NI
21	20	Female	CG	NI	CG	NI
22	20	Female	CG	NI	CG	NI
23	20	Female	CG	NI	CG	NI
24	20	Female	CG	NI	CG	NI
25	20	Female	CG	NI	CG	NI
26	20	Female	CG	NI	CG	NI
27	21	Male	CG	NI	CG	NI
28	21	Male	CG	NI	CG	NI
29	21	Male	CG	NI	CG	NI
30	21	Male	CG	NI	CG	NI
31	21	Female	CG	NI	CG	NI
32	21	Female	CG	NI	GF	NI
33	21	Female	CG	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
34	21	Female	CG	NI	CG	NI
35	21	Female	CG	NI	CG	NI
36	21	Female	CG	NI	CG	NI
37	22	Male	CG	NI	CG	NI
38	22	Female	CG	NI	CG	I
39	22	Female	CG	NI	CG	NI
40	22	Female	CG	NI	CG	NI
41	22	Female	CG	NI	CG	NI
42	23	Male	CG	NI	CG	NI
43	23	Male	CG	NI	CG	NI
44	23	Male	CG	NI	CG	NI
45	23	Male	CG	NI	CG	NI
46	23	Female	CG	NI	CG	NI
47	23	Female	CG	NI	CG	I
48	23	Female	CG	NI	CG	NI
49	23	Female	CG	NI	CG	NI
50	23	Female	CG	NI	CG	NI
51	24	Female	CG	NI	CG	NI
52	24	Female	CG	NI	CG	NI
53	24	Female	CG	NI	CG	NI
54	24	Female	CG	NI	CG	NI
55	24	Female	CG	NI	CG	NI
56	25	Male	CG	NI	CG	NI
57	25	Male	CG	NI	CG	NI
58	25	Male	CG	I	CG	NI
59	25	Male	CG	NI	CG	NI
60	25	Male	CG	NI	CG	NI
61	25	Female	CG	NI	CG	NI
62	25	Female	CG	NI	CG	NI
63	25	Female	CG	NI	CG	NI
64	25	Female	CG	NI	CG	NI
65	25	Female	CG	NI	GF	NI
66	25	Female	CG	NI	CG	NI
67	25	Female	CG	NI	CG	NI
68	25	Female	CG	NI	CG	NI
69	25	Female	CG	NI	CG	NI
70	26	Male	CG	NI	GF	NI
71	26	Male	CG	NI	CG	NI
72	26	Female	CG	NI	CG	NI
73	26	Female	CG	NI	CG	NI
74	26	Female	GF	I	CG	NI
75	26	Female	CG	NI	CG	NI
76	27	Male	CG	NI	CG	NI
77	27	Male	CG	NI	CG	NI
78	27	Female	CG	NI	CG	NI
79	27	Female	CG	NI	CG	NI
80	27	Female	CG	NI	CG	NI
81	27	Female	CG	NI	C	NI
82	27	Female	CG	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
83	27	Female	CG	NI	CG	NI
84	27	Female	CG	NI	CG	NI
85	28	Female	CG	NI	GF	NI
86	28	Female	CG	NI	GF	NI
87	28	Female	CG	NI	CG	NI

Tribal Vegetarian Population VT2 (29 to 40 years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	29	Male	CG	NI	CG	NI
2	29	Male	CG	NI	CG	NI
3	30	Male	CG	NI	CG	NI
4	30	Male	CG	NI	CG	NI
5	30	Male	CG	NI	CG	NI
6	30	Male	GF	NI	CG	NI
7	30	Male	CG	NI	CG	NI
8	30	Male	CG	NI	CG	NI
9	30	Male	CG	NI	CG	NI
10	30	Male	CG	NI	CG	NI
11	31	Male	CG	NI	CG	NI
12	31	Male	CG	NI	CG	NI
13	32	Male	CG	NI	CG	NI
14	32	Male	CG	NI	CG	NI
15	32	Male	CG	NI	CG	NI
16	32	Male	CG	NI	CG	NI
17	32	Male	CG	NI	CG	NI
18	33	Male	CG	NI	CG	I
19	33	Male	CG	NI	CG	NI
20	33	Male	CG	I	GF	NI
21	33	Male	CG	NI	CG	NI
22	34	Male	CG	NI	GF	NI
23	34	Male	CG	NI	GF	NI
24	34	Male	CG	NI	CG	NI
25	35	Male	CG	NI	GF	NI
26	35	Male	CG	NI	CG	NI
27	35	Male	CG	NI	CG	NI
28	35	Male	CG	NI	CG	NI
29	36	Male	CG	NI	GF	NI
30	36	Male	CG	NI	GF	NI
31	36	Male	GF	NI	CG	NI
32	36	Male	CG	NI	GF	NI
33	37	Male	GF	NI	CG	NI
34	37	Male	CG	NI	GF	NI
35	37	Male	CG	NI	GF	NI
36	37	Male	GF	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
37	37	Male	CG	NI	CG	NI
38	37	Male	CG	NI	CG	NI
39	37	Male	CG	NI	CG	NI
40	38	Male	GF	NI	CG	NI
41	38	Male	CG	NI	GF	NI
42	38	Male	CG	NI	CG	NI
43	39	Male	GF	NI	CG	NI
44	39	Male	CG	NI	GF	NI
45	39	Male	GF	NI	GF	NI
46	39	Male	CG	NI	CG	NI
47	39	Male	CG	NI	GF	NI
48	40	Male	GF	NI	GF	NI
49	40	Male	GF	NI	GF	NI
50	40	Male	GF	NI	CG	NI
51	40	Male	GF	NI	GF	NI
52	40	Male	GF	NI	GF	NI
53	40	Male	GF	NI	CG	NI
54	40	Male	GF	NI	CG	NI
55	40	Male	GF	NI	CG	NI
56	40	Male	CG	NI	GF	NI

Tribal Non-Vegetarian population NVT2 (29 to 40 Years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	29	Male	CG	NI	CG	NI
2	29	Male	CG	I	CG	NI
3	29	Female	CG	NI	CG	NI
4	29	Female	CG	NI	CG	NI
5	29	Female	CG	NI	CG	NI
6	29	Female	CG	NI	CG	NI
7	29	Female	CG	NI	CG	NI
8	29	Female	CG	NI	CG	NI
9	29	Female	CG	NI	CG	NI
10	30	Male	CG	NI	CG	NI
11	30	Male	CG	NI	CG	NI
12	30	Female	CG	NI	CG	NI
13	30	Female	CG	NI	CG	NI
14	30	Female	CG	NI	CG	NI
15	30	Female	CG	NI	CG	NI
16	30	Female	CG	NI	CG	NI
17	30	Female	CG	NI	CG	NI
18	30	Female	CG	NI	CG	NI
19	30	Female	CG	NI	CG	NI
20	30	Female	CG	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
21	30	Female	CG	NI	CG	NI
22	31	Male	CG	NI	CG	NI
23	31	Female	CG	NI	CG	NI
24	31	Female	CG	NI	CG	NI
25	31	Female	CG	NI	CG	NI
26	31	Female	CG	NI	CG	NI
27	31	Female	CG	NI	CG	NI
28	32	Male	CG	NI	CG	NI
29	32	Female	CG	NI	CG	NI
30	32	Female	CG	I	CG	NI
31	32	Female	CG	NI	CG	NI
32	32	Female	CG	NI	CG	NI
33	32	Female	CG	NI	CG	NI
34	33	Male	CG	NI	CG	NI
35	33	Female	CG	NI	CG	NI
36	33	Female	CG	NI	CG	NI
37	33	Female	CG	NI	CG	NI
38	33	Female	CG	NI	CG	NI
39	33	Female	CG	I	CG	NI
40	34	Male	CG	NI	CG	NI
41	34	Male	CG	NI	CG	NI
42	34	Male	CG	NI	CG	NI
43	34	Female	CG	NI	CG	NI
44	34	Female	CG	NI	CG	NI
45	34	Female	CG	NI	CG	NI
46	34	Female	CG	NI	CG	NI
47	34	Female	CG	NI	CG	NI
48	35	Female	GF	NI	GF	NI
49	35	Male	CG	NI	GF	NI
50	35	Male	CG	NI	CG	NI
51	35	Male	GF	NI	GF	NI
52	35	Male	CG	NI	CG	NI
53	35	Female	CG	NI	CG	NI
54	35	Female	CG	NI	GF	I
55	35	Female	CG	NI	GF	NI
56	35	Female	CG	NI	CG	NI
57	35	Female	CG	NI	GF	NI
58	35	Female	GF	NI	GF	NI
59	35	Female	CG	NI	CG	NI
60	35	Female	CG	NI	CG	NI
61	35	Female	CG	NI	CG	NI
62	35	Female	CG	NI	CG	NI
63	35	Female	CG	NI	GF	NI
64	36	Female	GF	NI	CG	NI
65	36	Female	CG	NI	CG	NI
66	36	Female	GF	NI	CG	NI
67	36	Female	CG	NI	CG	NI
68	37	Female	CG	NI	CG	NI
69	37	Female	GF	NI	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
70	37	Female	GF	NI	CG	NI
71	37	Female	CG	NI	CG	NI
72	37	Female	CG	NI	CG	NI
73	37	Female	CG	NI	CG	NI
74	38	Female	GF	NI	CG	NI
75	38	Female	GF	NI	GF	NI
76	38	Female	CG	NI	GF	NI
77	38	Female	GF	I	GF	NI
78	38	Female	GF	NI	CG	NI
79	38	Female	CG	NI	GF	NI
80	39	Male	CG	NI	GF	NI
81	39	Male	GF	NI	GF	NI
82	39	Female	GF	NI	GF	NI
83	39	Female	CG	NI	CG	NI
84	40	Male	GF	NI	GF	NI
85	40	Male	GF	NI	CG	NI
86	40	Male	CG	NI	GF	NI
87	40	Male	GF	NI	CG	NI
88	40	Female	GF	NI	CG	I
89	40	Female	GF	NI	CG	NI
90	40	Female	GF	NI	GF	NI
91	40	Female	CG	NI	GF	NI
92	40	Female	GF	NI	CG	NI
93	40	Female	CG	NI	GF	NI
94	40	Female	CG	NI	CG	NI

Tribal Vegetarian population VT3 (above 40 years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	41	Female	GF	NI	GF	NI
2	42	Male	CG	NI	CG	NI
3	42	Male	GF	NI	GF	NI
4	42	Male	CG	NI	GF	NI
5	42	Male	GF	NI	GF	NI
6	42	Male	GF	NI	CG	NI
7	42	Male	GF	NI	CG	NI
8	42	Female	GF	NI	GF	NI
9	43	Male	CG	NI	CG	NI
10	43	Male	GF	NI	GF	NI
11	43	Male	GF	NI	GF	NI
12	43	Female	GF	NI	GF	NI
13	43	Female	CG	NI	GF	NI
14	44	Male	CG	I	GF	NI
15	44	Male	GF	I	CG	NI
16	44	Male	GF	NI	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
17	45	Male	GF	NI	GF	NI
18	45	Male	GF	NI	GF	NI
19	45	Male	GF	NI	GF	NI
20	46	Male	GF	NI	GF	NI
21	47	Male	CG	NI	GF	I
22	47	Male	GF	NI	CG	NI
23	47	Male	GF	NI	GF	NI
24	47	Male	GF	NI	GF	NI
25	47	Female	GF	NI	GF	NI
26	48	Male	CG	NI	CG	NI
27	49	Male	GF	NI	GF	NI
28	49	Male	CG	NI	GF	NI
29	49	Male	GF	NI	GF	NI
30	49	Male	GF	NI	GF	NI
31	49	Male	GF	NI	GF	NI
32	49	Male	GF	NI	GF	NI
33	50	Male	GF	NI	GF	NI
34	50	Male	GF	NI	GF	NI
35	50	Male	GF	NI	GF	NI
36	50	Male	GF	NI	GF	NI
37	50	Male	GF	NI	GF	NI
38	50	Male	GF	NI	GF	NI
39	50	Male	GF	NI	GF	NI
40	50	Male	GF	NI	GF	NI
41	50	Male	GF	NI	GF	NI
42	50	Male	GF	NI	GF	NI
43	50	Male	GF	NI	GF	NI
44	50	Male	GF	NI	GF	NI
45	50	Male	GF	NI	GF	NI
46	51	Male	GF	NI	GF	NI
47	51	Male	GF	NI	GF	NI
48	51	Male	GF	NI	GF	NI
49	52	Male	GF	NI	GF	NI
50	52	Male	GF	NI	GF	NI
51	53	Male	GF	NI	GF	NI
52	54	Male	GF	NI	GF	NI
53	54	Male	GF	NI	GF	NI
54	55	Male	GF	NI	GF	NI
55	55	Male	GF	NI	GF	I
56	55	Male	GF	NI	GF	NI
57	55	Male	GF	I	GF	NI
58	56	Male	GF	NI	GF	NI
59	59	Male	GF	NI	GF	NI
60	60	Male	GF	NI	GF	NI
61	62	Male	GF	NI	GF	NI

Tribal Non-Vegetarian Population NVT3 (Above 40 years).						
S. No	**Age**	**Sex**	**Left Working side occlusal scheme**	**Right balancing side contact**	**Right working side occlusal contact**	**Left balancing side contact**
1	41	Male	CG	NI	GF	NI
2	41	Male	GF	NI	GF	NI
3	41	Male	GF	I	CG	NI
4	41	Male	GF	NI	GF	NI
5	41	Male	GF	NI	GF	NI
6	41	Male	CG	NI	GF	NI
7	41	Female	CG	NI	GF	NI
8	41	Female	CG	NI	CG	NI
9	41	Female	CG	NI	CG	NI
10	41	Female	CG	NI	CG	NI
11	41	Female	GF	NI	CG	NI
12	41	Female	CG	NI	CG	NI
13	41	Female	CG	NI	CG	NI
14	41	Female	CG	NI	CG	NI
15	41	Female	GF	NI	GF	NI
16	42	Male	GF	NI	GF	NI
17	42	Male	GF	NI	CG	NI
18	42	Male	GF	NI	GF	NI
19	42	Male	GF	NI	GF	NI
20	42	Male	GF	NI	GF	NI
21	42	Male	GF	NI	GF	NI
22	42	Male	GF	NI	GF	NI
23	42	Male	GF	NI	GF	NI
24	42	Male	GF	NI	GF	NI
25	42	Female	GF	NI	GF	NI
26	42	Female	GF	NI	CG	NI
27	42	Female	CG	NI	CG	NI
28	42	Female	CG	NI	GF	NI
29	42	Female	GF	NI	CG	NI
30	42	Female	GF	I	CG	NI
31	42	Female	CG	NI	GF	NI
32	43	Male	GF	NI	GF	NI
33	43	Male	GF	NI	GF	NI
34	43	Female	GF	NI	GF	NI
35	43	Female	CG	NI	CG	NI
36	43	Female	CG	NI	CG	NI
37	43	Female	GF	NI	GF	NI
38	43	Female	GF	NI	GF	NI
39	43	Female	CG	NI	CG	NI
40	44	Male	GF	NI	GF	NI
41	44	Male	GF	I	CG	NI
42	44	Male	GF	NI	GF	NI
43	44	Female	CG	NI	CG	NI
44	44	Female	GF	NI	GF	I
45	45	Male	GF	NI	GF	NI
46	45	Male	GF	NI	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
47	45	Male	GF	NI	GF	NI
48	45	Male	GF	NI	GF	NI
49	45	Male	GF	NI	GF	NI
50	45	Male	GF	NI	GF	NI
51	45	Male	GF	NI	GF	NI
52	45	Male	GF	NI	GF	NI
53	45	Male	GF	NI	GF	NI
54	45	Female	GF	NI	GF	NI
55	45	Female	GF	NI	CG	NI
56	45	Female	CG	NI	CG	NI
57	45	Female	GF	NI	GF	NI
58	45	Female	GF	NI	CG	NI
59	45	Female	CG	NI	GF	NI
60	45	Female	GF	NI	GF	NI
61	45	Female	CG	NI	GF	NI
62	45	Female	GF	NI	GF	NI
63	45	Female	GF	NI	GF	NI
64	45	Female	GF	NI	GF	NI
65	45	Female	GF	NI	GF	NI
66	45	Female	GF	NI	GF	NI
67	46	Male	CG	NI	GF	NI
68	46	Male	GF	NI	GF	NI
69	46	Male	GF	NI	GF	NI
70	46	Male	GF	NI	GF	NI
71	46	Male	GF	NI	GF	NI
72	46	Male	GF	NI	GF	NI
73	46	Female	GF	NI	GF	NI
74	46	Female	CG	NI	CG	NI
75	46	Female	GF	NI	CG	NI
76	46	Female	GF	NI	GF	NI
77	47	Male	GF	NI	GF	NI
78	47	Male	GF	NI	GF	NI
79	47	Male	GF	NI	GF	NI
80	47	Female	GF	NI	GF	NI
81	47	Female	GF	NI	GF	NI
82	48	Male	GF	NI	GF	NI
83	48	Male	GF	NI	GF	NI
84	48	Female	GF	NI	CG	NI
85	48	Female	GF	NI	GF	NI
86	49	Male	GF	NI	GF	NI
87	49	Male	GF	NI	GF	NI
88	50	Male	GF	NI	GF	I
89	50	Male	GF	NI	GF	NI
90	50	Female	GF	NI	GF	NI
91	50	Female	GF	NI	GF	NI
92	50	Female	GF	NI	GF	NI
93	50	Female	GF	NI	GF	NI
94	50	Female	GF	NI	GF	NI
95	50	Female	GF	NI	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
96	51	Male	GF	NI	GF	NI
97	51	Female	GF	NI	GF	NI
98	51	Female	GF	I	GF	NI
99	52	Female	GF	NI	CG	NI
100	53	Female	GF	NI	GF	NI
101	56	Female	GF	NI	GF	NI

Urban Vegetarian Population VU1 (17 to 28 Years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	18	Male	CG	I	CG	NI
2	18	Male	CG	NI	CG	I
3	18	Female	CG	NI	CG	I
4	19	Male	CG	NI	CG	I
5	19	Male	CG	NI	CG	I
6	19	Female	GF	NI	CG	I
7	20	Male	CG	I	GF	NI
8	20	Male	CG	I	GF	NI
9	20	Male	CG	NI	CG	I
10	20	Male	CG	NI	CG	I
11	20	Female	GF	NI	CG	I
12	20	Female	CG	I	CG	NI
13	21	Male	CG	NI	CG	I
14	21	Male	CG	NI	CG	I
15	21	Female	CG	NI	CG	I
16	21	Female	GF	NI	CG	I
17	21	Female	CG	NI	CG	NI
18	21	Female	CG	I	CG	NI
19	22	Male	CG	NI	CG	I
20	22	Male	CG	I	CG	NI
21	22	Female	CG	NI	CG	NI
22	23	Male	CG	NI	CG	I
23	23	Male	CG	I	CG	NI
24	23	Male	CG	I	CG	I
25	23	Female	CG	I	CG	NI
26	23	Female	GF	I	CG	NI
27	23	Female	CG	I	CG	NI
28	23	Female	CG	I	CG	NI
29	23	Female	CG	I	CG	NI
30	24	Male	CG	I	CG	I
31	24	Female	CG	I	CG	NI
32	24	Female	GF	I	CG	NI
33	24	Female	CG	I	CG	NI
34	24	Female	CG	I	CG	NI
35	25	Male	GF	I	CG	NI
36	25	Male	CG	I	CG	NI
37	25	Male	CG	I	CG	NI
38	25	Female	CG	I	CG	I

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
39	25	Female	CG	I	CG	NI
40	25	Female	CG	NI	CG	NI
41	25	Female	CG	I	CG	I
42	26	Male	CG	I	CG	NI
43	26	Male	CG	NI	CG	I
44	26	Female	CG	NI	CG	I
45	26	Female	CG	I	CG	NI
46	27	Male	CG	NI	CG	I
47	27	Male	CG	I	CG	NI
48	27	Male	CG	NI	CG	NI
49	27	Female	GF	NI	CG	I
50	27	Female	CG	NI	CG	I
51	28	Male	CG	I	CG	NI
52	28	Male	GF	I	CG	NI
53	28	Male	CG	I	CG	NI
54	28	Male	GF	I	CG	NI
55	28	Male	CG	I	CG	NI
56	28	Male	CG	NI	CG	I

Urban Non-Vegetarian Population NVU1 (17 to 28 Years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	18	Female	GF	I	CG	NI
2	18	Male	CG	I	CG	I
3	18	Male	CG	I	CG	NI
4	18	Male	CG	I	GF	NI
5	18	Female	CG	I	CG	NI
6	18	Female	CG	I	CG	NI
7	18	Female	CG	I	CG	NI
8	19	Male	GF	I	CG	NI
9	19	Male	CG	I	CG	NI
10	19	Male	CG	NI	CG	NI
11	19	Female	CG	I	CG	NI
12	19	Female	CG	NI	CG	NI
13	20	Male	CG	I	CG	NI
14	20	Male	CG	I	CG	NI
15	20	Female	CG	NI	CG	I
16	20	Female	CG	I	CG	I
17	20	Female	CG	I	CG	NI
18	20	Female	CG	NI	CG	I
19	21	Male	CG	I	CG	NI
20	21	Male	CG	NI	CG	I
21	21	Male	CG	NI	CG	I
22	21	Male	CG	NI	GF	NI
23	21	Male	CG	I	CG	NI
24	21	Male	CG	NI	CG	I
25	21	Male	CG	I	CG	NI
26	21	Female	CG	I	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
27	21	Female	CG	NI	CG	I
28	21	Female	CG	I	CG	NI
29	21	Female	CG	NI	CG	I
30	22	Male	CG	NI	CG	I
31	22	Male	CG	I	CG	NI
32	22	Male	CG	I	CG	I
33	22	Male	GF	I	GF	NI
34	22	Female	CG	I	CG	NI
35	22	Female	GF	NI	CG	I
36	23	Male	CG	I	CG	NI
37	23	Male	CG	NI	CG	I
38	23	Male	CG	NI	CG	NI
39	23	Male	CG	I	GF	I
40	23	Male	GF	NI	CG	I
41	23	Male	CG	I	GF	NI
42	23	Male	GF	I	CG	NI
43	23	Female	CG	NI	CG	NI
44	23	Female	CG	I	CG	NI
45	23	Female	CG	I	CG	NI
46	23	Female	CG	I	CG	NI
47	23	Female	CG	NI	CG	I
48	23	Female	CG	NI	CG	I
49	24	Male	CG	NI	CG	I
50	24	Male	CG	NI	CG	I
51	24	Male	GF	I	CG	NI
52	24	Male	CG	NI	CG	I
53	24	Male	CG	I	GF	NI
54	24	Male	CG	NI	CG	I
55	24	Male	CG	NI	CG	I
56	24	Male	GF	I	GF	NI
57	24	Female	CG	I	CG	NI
58	24	Female	CG	NI	CG	NI
59	25	Male	CG	NI	CG	I
60	25	Male	GF	I	CG	NI
61	25	Male	CG	NI	CG	I
62	25	Male	CG	NI	CG	I
63	25	Male	CG	I	CG	NI
64	25	Female	CG	I	CG	I
65	25	Female	CG	I	CG	NI
66	25	Female	CG	NI	CG	I
67	25	Female	CG	NI	CG	I
68	25	Female	CG	NI	CG	I
69	25	Female	GF	I	CG	NI
70	25	Female	CG	I	CG	I
71	26	Male	CG	I	CG	NI
72	26	Male	CG	NI	CG	I
73	26	Male	CG	I	CG	NI
74	26	Female	CG	NI	CG	I
75	26	Female	GF	NI	CG	I
76	26	Female	CG	I	GF	NI
77	26	Female	CG	I	CG	NI
78	27	Male	GF	I	CG	NI
79	27	Male	GF	I	CG	NI
80	27	Male	CG	I	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
81	27	Male	CG	I	CG	NI
82	27	Female	CG	I	CG	NI
83	27	Female	CG	I	CG	NI
84	27	Female	CG	NI	CG	I
85	27	Female	CG	I	CG	NI
86	28	Male	CG	NI	CG	I
87	28	Male	CG	I	CG	NI
88	28	Male	CG	I	CG	NI
89	28	Male	CG	NI	CG	I
90	28	Female	CG	NI	CG	I
91	28	Female	CG	NI	CG	I
92	28	Female	CG	NI	CG	I
93	28	Female	CG	I	CG	NI
94	28	Female	CG	I	CG	I
95	28	Female	CG	I	CG	NI

Urban Vegetarian population VU2 (29 to 40 years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	29	Male	GF	NI	GF	NI
2	29	Male	CG	NI	CG	NI
3	29	Male	CG	I	CG	NI
4	29	Female	GF	I	CG	NI
5	30	Male	GF	NI	GF	I
6	30	Male	GF	I	GF	NI
7	30	Male	GF	I	GF	NI
8	30	Male	GF	NI	CG	I
9	30	Female	GF	I	CG	I
10	31	Male	GF	NI	CG	I
11	31	Male	GF	I	CG	I
12	31	Male	GF	NI	GF	NI
13	31	Male	CG	NI	CG	I
14	31	Female	GF	I	GF	NI
15	31	Female	CG	I	CG	NI
16	31	Female	GF	I	CG	NI
17	32	Male	CG	NI	GF	I
18	32	Male	GF	I	CG	NI
19	32	Male	CG	I	GF	NI
20	32	Male	GF	I	GF	NI
21	32	Male	CG	NI	CG	I
22	32	Female	CG	I	CG	NI
23	32	Female	CG	I	GF	NI
24	32	Female	CG	NI	CG	I
25	33	Male	GF	NI	GF	I
26	33	Male	CG	NI	CG	I
27	33	Male	GF	NI	GF	I
28	33	Female	GF	I	CG	NI
29	33	Female	GF	I	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
30	33	Female	GF	I	GF	I
31	33	Female	CG	I	CG	NI
32	34	Male	CG	NI	GF	NI
33	34	Male	GF	NI	CG	I
34	34	Male	CG	I	CG	NI
35	34	Male	GF	I	CG	NI
36	34	Male	CG	I	CG	NI
37	34	Female	CG	I	CG	NI
38	34	Female	GF	I	GF	NI
39	35	Male	CG	NI	CG	I
40	35	Male	GF	NI	GF	I
41	35	Male	CG	NI	GF	NI
42	35	Male	GF	I	GF	NI
43	35	Female	CG	NI	GF	I
44	35	Female	GF	NI	GF	NI
45	36	Male	GF	NI	CG	I
46	36	Male	CG	I	GF	I
47	36	Male	CG	I	GF	NI
48	37	Male	GF	NI	CG	NI
49	37	Male	CG	NI	CG	I
50	38	Male	GF	I	CG	NI
51	38	Male	CG	I	CG	NI
52	38	Male	CG	NI	CG	I
53	38	Female	GF	NI	CG	I
54	39	Female	CG	I	GF	NI
55	40	Male	GF	NI	CG	I
56	40	Female	GF	NI	CG	NI

Urban Non-Vegetarian Population NVU2 (29 to 40 years)						
S. No	**Age**	**Sex**	**Left Working side occlusal scheme**	**Right balancing side contact**	**Right working side occlusal contact**	**Left balancing side contact**
1	29	Male	CG	I	CG	NI
2	29	Male	CG	I	GF	NI
3	29	Male	GF	I	GF	NI
4	29	Male	CG	I	CG	NI
5	29	Female	CG	NI	CG	I
6	29	Female	GF	NI	CG	I
7	29	Female	GF	NI	CG	I
8	30	Male	GF	I	GF	NI
9	30	Male	GF	I	GF	NI
10	30	Male	GF	NI	GF	I
11	30	Male	CG	I	CG	I
12	30	Male	GF	I	CG	NI
13	30	Female	CG	NI	GF	I
14	30	Female	GF	I	CG	NI
15	30	Female	GF	NI	GF	I
16	30	Female	CG	NI	CG	I
17	30	Female	GF	NI	CG	I
18	31	Male	CG	I	GF	NI
19	31	Male	CG	I	CG	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
20	31	Male	CG	NI	CG	I
21	31	Male	CG	NI	CG	I
22	31	Male	GF	I	CG	NI
23	31	Male	GF	I	GF	NI
24	31	Male	GF	NI	GF	I
25	31	Female	CG	I	CG	NI
26	31	Female	GF	NI	CG	NI
27	31	Female	CG	I	GF	NI
28	32	Male	GF	NI	GF	NI
29	32	Male	CG	I	GF	I
30	32	Male	GF	NI	CG	I
31	32	Male	CG	I	GF	NI
32	32	Male	GF	I	GF	NI
33	32	Male	CG	I	GF	NI
34	32	Female	CG	I	GF	NI
35	32	Female	GF	I	CG	NI
36	32	Female	CG	NI	CG	I
37	32	Female	GF	NI	CG	I
38	33	Male	GF	I	CG	NI
39	33	Male	CG	I	GF	NI
40	33	Female	CG	NI	CG	I
41	33	Female	GF	I	GF	NI
42	34	Male	CG	NI	CG	I
43	34	Male	GF	I	GF	NI
44	34	Male	CG	NI	GF	I
45	34	Male	CG	I	GF	NI
46	34	Male	GF	NI	GF	NI
47	34	Male	GF	NI	CG	I
48	34	Female	GF	I	GF	NI
49	34	Female	CG	NI	CG	I
50	34	Female	CG	I	GF	NI
51	34	Female	GF	NI	CG	I
52	35	Male	CG	NI	GF	NI
53	35	Male	GF	NI	GF	I
54	35	Male	GF	NI	CG	I
55	35	Male	CG	I	CG	I
56	35	Male	CG	I	CG	NI
57	35	Male	GF	NI	CG	I
58	35	Male	GF	NI	CG	NI
59	35	Male	CG	NI	GF	I
60	35	Female	GF	NI	CG	NI
61	35	Female	CG	I	CG	NI
62	35	Female	GF	NI	GF	NI
63	35	Female	GF	I	CG	NI
64	35	Female	GF	I	CG	NI
65	36	Male	GF	NI	CG	I
66	36	Male	CG	NI	CG	I
67	36	Male	GF	I	CG	NI
68	36	Male	CG	I	CG	NI
69	36	Male	CG	NI	CG	I
70	36	Female	GF	I	CG	NI
71	36	Female	CG	I	GF	NI
72	36	Female	CG	NI	CG	I
73	37	Male	CG	I	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
74	37	Male	GF	NI	CG	I
75	37	Male	GF	I	GF	NI
76	37	Male	GF	NI	CG	NI
77	37	Male	GF	NI	CG	I
78	37	Male	GF	I	GF	NI
79	37	Male	GF	I	CG	NI
80	37	Male	GF	I	CG	NI
81	37	Female	GF	I	CG	NI
82	37	Female	GF	I	GF	NI
83	37	Female	GF	I	GF	NI
84	38	Male	CG	I	GF	NI
85	38	Male	GF	I	CG	NI
86	38	Male	CG	NI	CG	I
87	38	Male	CG	I	GF	NI
88	38	Male	CG	NI	CG	I
89	38	Female	CG	I	CG	NI
90	39	Male	CG	I	CG	NI
91	39	Male	CG	NI	CG	I
92	39	Male	CG	I	GF	I
93	39	Female	CG	NI	GF	I
94	40	Female	CG	NI	GF	NI

Urban Vegetarian Population VU3 (above 40 Years)						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	41	Male	GF	NI	GF	I
2	41	Male	CG	I	GF	NI
3	41	Male	GF	I	GF	NI
4	41	Male	CG	NI	CG	NI
5	41	Male	GF	NI	GF	I
6	42	Male	GF	I	GF	I
7	42	Male	GF	I	GF	NI
8	42	Male	GF	NI	GF	NI
9	42	Male	GF	I	GF	NI
10	42	Male	GF	I	GF	NI
11	42	Male	GF	NI	CG	NI
12	42	Female	GF	NI	GF	NI
13	43	Male	GF	I	GF	I
14	43	Male	GF	NI	GF	I
15	43	Male	GF	I	GF	NI
16	43	Male	GF	I	GF	NI
17	43	Male	GF	NI	CG	NI
18	43	Male	GF	NI	CG	I
19	43	Male	GF	NI	GF	I
20	43	Male	GF	I	GF	NI
21	43	Male	GF	I	GF	NI
22	43	Female	GF	I	GF	I
23	44	Male	GF	I	GF	NI
24	44	Male	GF	I	CG	NI
25	44	Male	GF	NI	GF	I

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
26	44	Male	CG	NI	GF	I
27	44	Male	GF	NI	GF	I
28	44	Female	GF	I	GF	NI
29	45	Male	GF	NI	GF	I
30	45	Male	GF	NI	GF	I
31	45	Male	GF	NI	GF	I
32	45	Male	GF	NI	GF	I
33	45	Male	CG	I	GF	NI
34	45	Female	GF	NI	GF	NI
35	46	Male	GF	NI	GF	I
36	46	Male	GF	NI	GF	I
37	46	Female	GF	I	CG	NI
38	46	Male	GF	NI	GF	NI
39	47	Male	GF	NI	GF	NI
40	47	Male	GF	I	GF	I
41	47	Male	GF	NI	GF	NI
42	47	Male	CG	I	CG	NI
43	47	Female	GF	NI	GF	I
44	47	Male	GF	NI	GF	I
45	48	Male	CG	I	GF	NI
46	48	Male	GF	NI	GF	I
47	48	Male	GF	NI	GF	NI
48	49	Male	CG	NI	GF	NI
49	49	Male	GF	I	GF	NI
50	49	Male	GF	I	GF	NI
51	50	Male	GF	I	GF	NI
52	50	Male	GF	NI	GF	NI
53	50	Male	CG	I	GF	NI
54	51	Male	CG	I	GF	NI
55	51	Male	CG	NI	GF	I
56	52	Male	GF	NI	GF	I

Urban Non-Vegetarian Population NVU3 (Above 40 years).						
S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
1	41	Female	GF	NI	GF	I
2	41	Female	GF	NI	CG	I
3	41	Female	GF	NI	GF	I
4	41	Male	CG	I	GF	NI
5	41	Male	CG	I	GF	NI
6	41	Female	CG	NI	GF	I
7	41	Female	CG	NI	GF	I
8	41	Female	GF	NI	GF	I
9	41	Female	GF	NI	GF	I
10	41	Female	GF	I	GF	NI
11	41	Female	GF	NI	GF	NI
12	41	Female	GF	I	GF	NI
13	42	Female	GF	NI	GF	I
14	42	Female	GF	I	GF	NI
15	42	Female	CG	I	GF	NI

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
16	42	Male	CG	I	CG	I
17	42	Male	GF	NI	CG	I
18	42	Male	CG	I	GF	NI
19	42	Male	CG	NI	GF	I
20	42	Male	CG	I	GF	I
21	42	Female	GF	I	GF	NI
22	42	Female	GF	I	GF	NI
23	42	Female	GF	I	GF	NI
24	42	Female	GF	NI	GF	I
25	42	Female	GF	I	CG	NI
26	43	Female	CG	NI	GF	NI
27	43	Female	CG	I	GF	NI
28	43	Female	GF	I	GF	NI
29	43	Male	GF	NI	GF	I
30	43	Male	GF	NI	GF	I
31	43	Male	CG	I	GF	NI
32	43	Male	GF	I	GF	NI
33	43	Male	CG	NI	GF	I
34	43	Male	CG	NI	CG	I
35	43	Male	GF	I	GF	NI
36	43	Female	CG	NI	CG	NI
37	43	Female	GF	I	CG	NI
38	43	Female	GF	NI	GF	NI
39	43	Female	CG	I	GF	I
40	43	Female	GF	NI	GF	I
41	44	Female	GF	NI	CG	I
42	44	Female	GF	I	GF	NI
43	44	Female	GF	NI	GF	NI
44	44	Male	CG	NI	GF	I
45	44	Male	GF	I	CG	NI
46	44	Male	GF	I	GF	NI
47	44	Male	GF	NI	GF	NI
48	44	Male	GF	I	GF	NI
49	44	Male	GF	NI	GF	I
50	44	Female	CG	NI	GF	I
51	44	Female	GF	I	GF	NI
52	45	Female	CG	NI	GF	I
53	45	Female	CG	NI	GF	NI
54	45	Female	CG	I	GF	NI
55	45	Male	GF	NI	GF	NI
56	45	Male	CG	NI	GF	I
57	45	Male	CG	NI	GF	I
58	45	Male	CG	NI	GF	I
59	45	Male	CG	I	GF	NI
60	45	Male	CG	I	GF	NI
61	45	Male	GF	I	CG	NI
62	45	Male	GF	NI	GF	I
63	45	Male	CG	I	GF	NI
64	45	Male	CG	I	GF	NI
65	45	Female	GF	NI	GF	I
66	46	Female	CG	I	GF	NI
67	46	Female	GF	NI	GF	I
68	46	Female	GF	NI	GF	NI
69	46	Male	GF	NI	CG	I

S. No	Age	Sex	Left Working side occlusal scheme	Right balancing side contact	Right working side occlusal contact	Left balancing side contact
70	46	Male	GF	I	GF	NI
71	46	Male	CG	I	GF	NI
72	46	Female	GF	NI	GF	NI
73	46	Female	GF	I	GF	NI
74	47	Female	CG	NI	GF	I
75	47	Female	GF	I	GF	NI
76	47	Male	CG	I	GF	I
77	47	Male	GF	I	GF	NI
78	47	Male	GF	NI	GF	I
79	47	Male	GF	I	CG	NI
80	47	Female	GF	I	GF	NI
81	48	Female	GF	I	GF	NI
82	48	Male	GF	I	GF	NI
83	48	Male	GF	I	CG	NI
84	48	Male	CG	I	GF	NI
85	48	Male	CG	NI	GF	I
86	48	Male	GF	I	GF	NI
87	48	Female	CG	I	GF	NI
88	48	Female	GF	NI	GF	NI
89	49	Male	CG	NI	GF	I
90	50	Male	GF	NI	GF	NI
91	51	Female	CG	I	GF	NI
92	51	Male	CG	I	GF	I
93	53	Female	CG	NI	GF	I

Canine Guidance : **“CG”**

Group function : **“GF”**

Interference : **“I”**

No Interference : **“NI”**