Discussion
Maxillofacial (Intra Oral) defects are most commonly rehabilitated using Maxillary Definitive Obturator and Mandibular Resection Guidance Prosthesis and it assists in improving OHRQol of such patients.

This study was investigated to evaluate the Impact of OHRQol of patients with Intra Oral- Maxillofacial Defects after Prostodontic Therapy with Definitive Obturator and Mandibular Resection Guidance Prosthesis.

A very few studies emphasis on OHRQol among patients using an Intra Oral Prosthesis\textsuperscript{44-46}. Smaller sample size was the main limitation of these studies. Usually, state of physical or psychological well-being and mortality measurements were seen in oral cancer patients, but OHRQol is considered more valuable in relation to psychosocial wellbeing of patient.

Numerous investigators reported factors such as movement and function of Obturator Prostheses, Speech intelligibility, Leakage of Fluid during Swallowing, Involvement of Dentition and Aesthetics, greatly influence the OHRQol in obturator prosthesis patient\textsuperscript{47, 48}.

In the present study, a total of **Eighty Five (85)** patients, of fifty (50) maxillectomy and (35) mandibulectomy patients were investigated. This study had greater sample size when compared to previous studies done by Depprich et al, Rogers et al, Hertrampf et al, Irish et al and Kornblith et al.

Hypothetically, major benefits of Definitive Obturator Prostheses were to restore form, contour and function, retention, stability and support. Prosthesis retention is the most critical part in Obturator prosthesis.
Previous studies reported that location and size of the maxillary defects enormously influenced the obturator prosthesis function. Kornblith et al addressed that patients who had resection of no more than the third of the soft palate and the fourth of the hard palate had better overall obturator function. They concluded that defects that involved more than half the hard palate or included the premaxilla, and both canines were poor candidates for prosthetic reconstruction.

Obturator function and QOL is mainly influenced by the size of the maxillectomy defect and extent of the hard and soft palate resection. Patients often experience regurgitation of fluids or solids while drinking or eating and hyper nasality of speech, particularly when the defect is not well sealed.

**Rogers et al.** documented that patients with obturator prostheses involving larger defects had significant impact on retention, form and physical function. **Okay et al.** concluded that retention and stability of prostheses were compromised as the defect size increased, resulting in compromised obturator function.

**Brown et al** also reported that modifying the treatment options according to the patients’ health condition and personal preferences. They stated that obturator reconstruction was the ultimate choice of treatment for the patients with Class 1 to 2a and 2b defects. They also enumerated that composite free flap was ultimate treatment option for larger alveolar and Class 3 or 4 defects.

But Chigurupati and Chen et al documented obturator function was not related with the size of the defect. Similar with Chigurupati’s report, our study reported that size of the defect were not influenced overall performance of the obturator prosthesis.
This might be due to Active Participation of Maxillofacial Prosthodontists’ and Surgeons’ in planning and execution of rehabilitating maxillofacial defects, to reduce bias, obturator prostheses & the mandibular resection prosthesis was done in the researcher’s department.

Numerous previous studies, have used brown classification system to assess the oral health related quality of life in maxillary defects. In this study, Okay Classification was used.

While other classification provides importance only on soft tissue and bony components restoration, the classification proposed by Okay et al. gives importance to the Dento-Alveolar restoration and rehabilitation.

The prime consideration which was given in their classification was on Palatal defect extension and the stability for successful Obturator retention.

A classification system should be reliable, rationale and should classify the defects according to the rehabilitative needs. In respect with reconstruction goals, it should also be able to identify the ability and deficits and allow resources of documentation for the results comparison.

For assessing the health related quality of life in cancer patients, various researchers have utilized European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire Core 30 (QLQ-C30).49-61
In the present study, an **Oral Health Impact Profile-Edent -19, Obturator Functioning Scale and Maxillofacial Prosthesis Performance Scale (MFPPS-10)** were utilized. These scales were designed to provide a comprehensive measure of the dysfunction, discomfort, and disability attributed to oral facial conditions. This questionnaire system aids in comparing multiple study groups.

In the present study, the best OHIP-Edent domain percentage scores for the complete group were 25.4% for psychological disability, 27.2% for social disability, and 30.4% for physical pain. The highest score was for psychological discomfort (40.8%). Results indicated that psychological discomfort improved only 60 % but other subscales of OHIP scale scores shown dramatic improvement of 70 ±5 % after 3 months of follow-up.

Psychological discomfort was the most prevalent OHRQol impairment with 40.8% of the patients followed by functional limitation (36.13%) and physical pain (30.4%). After rehabilitation, significant functional improvements (M=5.42/64%) was observed only on long term follow up.

Highest score was recorded for Psychological Discomfort because these patients were quite conscious of their disability and psychosocial distress caused by the disease.

In the present study, With regard to average percentage for oral health impact profile – Edent -19 scale after 2 weeks and 3 months follow-up stated that enhancement of chewing ability and prosthesis comfort requires minimum of (2 months) time frame to accommodate with new obturator prosthesis. While observing OHIP –Edent scale, highly significant difference (p value =.0005) were found in all parameters between 2 weeks and 3 months of prosthesis function.
This indicated that maxillofacial prosthesis does seem to have an overall effect on oral health related quality of life.

Among the studies discussed pertaining to OHRQol in maxillectomy patients, only one study compared the OHRQol of general population with that of maxillectomy patients.

With this report, oral function like phonetics, mouth opening, dry mouth, pain and deglutition was affected significantly in malignancies.\textsuperscript{62-65}

It is reported in previous studies certain factors such as the extent and location of the resection, various cancer treatments, coping strategies of the patient, along with function of the prostheses and type of rehabilitation plays a significant role in determining the OHRQol.

Previous studies reported the most common problems in patients rehabilitated with surgical or interim obturator prosthesis were leaching of foods, speech impairment, and masticatory problem. These problems may lead to social negligence.

With respect to swallowing, individuals who generated higher oral pressures were less likely to report leakage of liquids around the obturator. This indicates that a tight seal between an obturator and the hard/soft tissues of the maxilla would create an airtight space in which greater oral pressures could be generated.

Mean/average percentage OFS score after 3 months of prosthesis function were chewing problems (M=3.64/36.4%), speech problems (M=10.84/36.1%), aesthetics problems (M=1.18/23.6%) and miscellaneous problems (M=8.60/28.6%).
The observed clinical results specified that, there was a significant improvement of 69% patients in chewing ability, speech adaptation, appearance and miscellaneous activities after 3 months when compared to 2 weeks (59.1%) of prosthesis function. This results supports that chewing and speech activities require minimum of 2 months to adapt to new prosthesis.

We found that 36% of the patients experienced leakage while swallowing. This was the most common problem observed among the individuals. Results of the present study were similar to other previous studies conducted by Kornblith et al (25%), Rieger et al (20%) and Irish et al (40%). Thus leakage while swallowing is a great concern in the patients with hemimaxillectomy even with their obturators in place.

For better psychosocial adjustment, speech, mastication, functioning of the obturator plays an important role in rehabilitation. This lower scores indicates that maxillary definitive obturator prosthesis had better oral health related quality of life in terms of their psychological, family & social functioning.

Highest impact was recorded for taste perception problems. It shows a significant (p ≤ 0.013) reduction in MFPPS. This finding is in agreement with the report of Allen and McMillan. Declined taste perception is caused by factors like surgical excision of maxillary segments, dental and systemic deterioration, atrophy of taste buds, and medications.

Rehabilitation with definitive Obturator prosthesis enhances the masticatory efficiency, leading to improved taste perception.

Athia et al stated that a positive correlation exists between chewing ability and OHRQol, difficulties in chewing compromises OHRQol and indicate a reduced oral well-being. Patient satisfaction and chewing ability were the key elements in dealt with
maxillofacial region and masticatory function directly related with OHRQol. Whenever masticatory performance is not efficient, it is most likely lead to compromised oral health related quality of life \(^{66-68}\)

In our study reported, that the chewing efficiency significantly improved after 3 months of definitive prosthesis in all three scales (OHIP-Edent -19, OFS -15 & MFPPS-10) when compared to 2 weeks.

Similar observations were made by Zarb and Bolender study. They stated that learning to chew satisfactorily with new denture prosthesis requires at least 6 to 8 weeks (2 Months). Patients will become discouraged unless they are aware that this learning period to be expected. New memory patterns often must be established for both the masticatory muscles and the facial muscles. Once the pattern become automatic, chewing process will take place without conscious effort \(^{69-72}\).

Speech problems usually are observed immediately after prosthetic rehabilitation. Older patients experience greater difficulties in adapting speech to new prosthesis and also need longer time to regain their normal speech. Speech adaptation to new prosthesis normally takes place within 2 to 4 weeks after insertion.

These results suggest the reestablishment of these domains at 3 months of prosthesis function. The muscles of the tongue, cheeks, and lips must be trained to retain the obturator prosthesis in position on the ridges during mastication.

In addition, salivary excess may impair functional comfort and make chewing and speech difficult during the initial period of obturator function. Finally, patients must understand that their appearance with new prosthesis will become more natural with time. A repositioning of the oral and facial muscles and a restoration of the former...
facial dimension and contour by the new prosthesis may seem like too great a change in the patient’s appearance.

Masticatory muscle balance and mandibular movements were adversely affected by mandibulectomy, leading to altered masticatory movement and deviation of residual fragment towards the surgical side. Other observed dysfunction were mastication, speech and swallowing and Angular path of opening and closing mandibular pattern. Less precise envelope of motion occurs towards the surgical site during mastication\textsuperscript{73-75}.

Rehabilitation of mandibular defects after tumor resection is one of the most challenging problems facing maxillofacial prosthodontist. Swallowing, mastication, speech, control of saliva and psychic functioning are most commonly seen adverse effects by Mandibulectomy patients\textsuperscript{76-79}.

Based on the clinical observation of Rehabilitated Mandibular Patients, the most prevalent impact on OHRQol by OHIP – subscale; Psychological Discomfort (42.5%) specified that nearly half of the patients were upset with dental problems and self-conscious about the prosthesis even after the 2 weeks of follow up. Despite the discomfort in psychological subscale, there was significant improvement in functional limitation (30%), physical pain (26%), psychological disability (28%) and social disabilities (25.8%) after long term follow up.

Psychological discomfort was the most prevalent OHRQol impairment with 36% of the patients followed by handicap (31.7%) and functional limitation (30%). Results obtained by the Rehabilitated Mandibular Resected Patients OHIP-Edent scores were also similar to that of Definitive Obturator Prosthesis.
The mean OFS score for mandibular rehabilitated patients on 3 months of follow-up was 21.66. However, Mean / average percentage score for chewing (M=3.29/32.9%), speech (M=8.94/29.8%), aesthetics (M=2.03/33.6%) and miscellaneous (M=8.09/25.5%) after 3 months of function.

The most ubiquitous impact on OHRQol was problems with appearance. Since a considerable period of time had elapsed after the resection, the acceptance of the guidance appliance was much more difficult for the patient.

Guidance therapy improves form and function of the individuals and it serves as an interim basis for neuro muscular adaptation to correct the existing deranged occlusion. In addition to the above, other factors such as masticatory muscle pull, mandibular deviation and uncoordinated masticatory movements also influence facial disfigurement. Facial aesthetics and oral functions are essential for social interaction and have an impact on individual’s OHRQol.

The locations and sizes of the mandibular defect in the present study did not significantly affect HRQOL. On the contrary, Young et al. noted that the site of resection appears to have an impact with posterior resections involving the mandibular angle having the most adverse effects on appearance and those involving the parasymphysis (lateral) having the most deleterious effect on overall QOL. Young et al. and Rogers et al have also concluded that resections involved in parasymphysis deleterious effect on mastication, lip support and aesthetics. Our study observations were similar with Young and Rogers et al studies and it is likely that these factors contributed to significant impairment in OHRQol\textsuperscript{80-82}.
When analysing the MFPPS score of rehabilitated Mandibulectomy patients after 3 months improvement for various dimension were, psychological aspects (M=1.54/30.8%), aesthetics (M=1.29/25.6%), taste ability (M=1.60/32%) oral hygiene (M=1.43/28.4%), general satisfaction (M=1.54/30.8%) and saliva control (M=1.74/34%).

Highest score was recorded for problems with saliva control (34.8%) followed by general satisfaction and psychological aspects (30.8%). This may be due to problems in speaking and chewing and alterations in appearance may have been frequently reinforced by a range of strained and negative social interactions with others. Due to loss of function and unpleasant appearance which leads to markedly restrict patient’s normal social activities.

The positive thinking about the treatment is that concentration should not be on what is lost in the eradication of disease, but rather captivating complete benefit of the existing structures.

The OHRQol after rehabilitation with obturator prostheses were calculated to be 69% (± 2%) after 3 months in all three scales. Almost same observations were made for mandibular resection prostheses 70% (± 2%).

Results obtained in the study cannot be compared with the results of the previous Studies due to difference in their study pattern, tests and scales. However, the results of the present study are similar to the results obtained by Depprich et al, Schwarz and Hinz and,Hertrampf et al.
Studies conducted by Irish et al. and Kornblith et al also reported that the patients adjusted favourably after maxillectomy and rehabilitation with obturator prostheses.

Comparison of definitive obturator and mandibular resection prostheses after 3 months, there was no significant difference (p value=.106) in OHIP-Edent, significant difference (p value = 0.025) in OFS and no significant difference in MFPPS (p value =.317) were observed.

The main consideration is to form a Novel Scale to assess the oral health related quality of life for maxillofacial defects (Intra Oral Defects).

**Pitfalls of Oral Health Impact Profile –Edent (OHIP-EDENT-19)**

In this scale, question for psychological discomfort, “Have been worried by dental problems” may not be essential once the prostheses is in function

Question addressed for physical pain such as painful aching / sore spot dealt with same morbidity

Likewise, questions for physical pain had any difficulty in eating foods with prosthesis / uncomfortable denture both had a similar significance.

Questions for psychological disability subscale, “have you been upset because of your prosthesis?” “Have you been bit embarrassed because of your prosthesis?” “Have you avoided going out because of your prosthesis?” all the three were interrelated.
Pitfalls of Obturator functioning scale:

Questions related to problems with speech “Difficulty in talking in public?” “Speech difficult to understand?” “Difficulty in talking in phone?” Had similar implications.

Failure to address problems related to prosthesis fit, salivary flow, oral hygiene and taste perception problems aspects.

The problems encountered after rehabilitation of mandibulectomy patients with mandibular resection or guidance prostheses are retention and stability (Do you feel uneasy during meals due to loose & unstable prosthesis?), taste perception (Has your prosthesis altered your taste sensation?) and general satisfaction (Do you have any problem with overall Performance of the prosthesis?) aspects of questionnaire’s have not been emphasized in this scale. Hence, Obturator functioning scale may not be suitable for rehabilitated mandibulectomy patients.

When comparing maxillofacial defect rehabilitation with conventional prosthesis, it may possess many challenges to enhance the oral health quality of life in restoring the maxillofacial defect. This may be successfully achieved through sound theoretical knowledge, appropriate surgical technique, and surgical skill of the operator, maxillofacial prosthetic experience and team approach.

Precise treatment planning and designing in fabrication of intra oral prostheses could certainly enhance the Quality of life of patients with maxillofacial defects.

There is significant improvement in mastication, speech, deglutition and appearance after rehabilitation with maxillofacial prostheses. Therefore it is an essential pre-requisite for oro-facial defects which in turn support the patient in resuming their normal social life.