IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 17, Issue 4 Ver. 8 (April. 2018), PP 18-26
www.iosrjournals.org

Comparison Of Two Different Protocols For Immediate Placement Of Dental Implants In Lower Molar Extraction Sockets With Limited Restorative Space .

Dr.Segin Chandran K R MDS (OMFS)[1],Dr.Subramonian S MDS (OMFS)[2].
1*Assistant Professor, Department of Dentistry, SMCSI Medical College, Karakonam, Kerala, India.*
2 Associate Professor, Department of Dentistry , SMCSI Medical College , Karakonam, Kerala, India.
**Corresponding author: Dr.Subramonian S MDS(OMFS)*

Abstract* :Dental implants placed in extraction sockets gained maximum popularity because it reduces the treatment time drastically. Previously implants in extraction sockets were considered only in the anterior region, the latest treatment protocols evolved in last decade, gives promising results to suggest the same in the posterior region. The teeth in the mandibular posterior region are in the most load bearing area and should be considered with caution. This research paper evaluates the merits and demerits of two different protocols for implant placements in lower molar extraction sockets.Group A - Two implants ,one each in mesial and distal sockets of mandibular molars immediately after extraction. Group B -One implant in inter radicular septum between mesial and distal sockets of mandibular molars, immediately after extraction.Both groups were evaluated for the primarystability, loading time ,biomaterials used, impression difficulties and prosthetic complications. The inference from this study is, deep threaded knife edge larger diameter implants placed centrally and axially in immediate extraction sockets of mandibular molars offer a less complicated alternative to two implants placed in mesial and dis- tal sockets splinted by means of crown cementation where restorative space available is less than 12 mm mesiodistally.*

Keywords *-Dental Implants, Fresh extraction sockets, Immediate implants, Immediate loading, Deep thread implants*

Date of Submission: 30-03-2018 Date of acceptance: 16-04-2018

I. Introduction

Permanent Mandibular first molar are the first set of teeth to erupt in oral cavity along with central incisors at the age of 6-7 years. May be due to same reason[1], they are more susceptible to dental caries and are the most frequently extracted teeth in the dental arches. The awareness of consequences of missing teeth and need of

minimally invasive replacement, avoiding reduction of adjacent teeth for anchorage made dental implant as the first choice in the replacement of mandibular first molars. [2]

Preservation of existing hard and soft tissues is the key consideration for immediate placement of dental implants, as it preserves the bone around it and maintains the tissue contour. Immediate loading, early loading or delayed loading were done depending on the Initial stability achieved during the insertion. [3] Traditionally a time gap of three months for implants in mandible and six months for implants in maxilla were considered to be ideal for the osseointegration and secondary stability. The immediate loading protocol is gaining popularity and demand for the same in immediate extraction sockets are in high priority.[4]

The demand for immediate function and aesthetics were there from ages back . The works done by Leonard L Lincow and coworkers in 1960-1970 gave initial thoughts for immediate loading concept. After refining the protocols and changing the implant designs, now it has emerged as an accepted protocol even in immediate placement of implants in extraction sockets.[5]

The presence of vital structures like inferior alveolar nerve just beneath or in close relation to roots of first permanent mandibular molar necessitates the use of buccal and lingual cortices or mesial and distal interradicular septa as primary engaging sites for dental implant threads. But in case of extraction of deciduous molar or resorbed root stumps where there is maximum amount of alveolar bone present in the bifurcation area and the bone available for engagement of initial few threads of dental implants to the native bone is an added advantage.

This study is aimed at evaluating the scope of two different protocols for immediate implant placement and possibility of immediate loading of the same.

II. Aim

To compare and evaluate the merits and demerits of two protocols during immediate implant placement surgery in lower molar extraction sockets - Group A: Two implants, one each in mesial and distal sockets of mandibular molars immediately after extraction. Group B: One implant in interradicular septum between mesial and distal sockets of mandibular molars, immediately after extraction .

III. Materials and Methods

3.1 Inclusion criteria for Group A and B

Each group of 10 patients with ASA1 (American Society of Anaesthesiologists) medical status, without any systemic conditions or without smoking habit were selected .The study was restricted to the extraction and im- mediate implant placement done in mandibular molar extraction at an age group ranging from 20 to 60 yrs. Mandibular molars with divergent roots, indicated for extraction other than peri apical pathology and with intact buccal, lingual and interradicular bone. All the selected cases had a limited mesio distal edentulous span of less than 12 mm.

3.2 Methodology

Group A

Atraumatic extraction of offending tooth was done. Socket was inspected for intact buccal, lingual and inter radicular septum. After homeostasis regular root form implants with internal hex and 11 degree conical tapered connection were placed in either sockets of mandibular first molar. Osteotomy was performed to a diameter of 2.8 mm in either root sockets with drills and 3.5 mm Dentium Superline implants were placed with an insertion torque of 40 N in implant hand piece and wrenched up to 60 N primary stability. Implants were positioned in a mid point bucco lingually and maintaining adequate space from adjacent teeth and implants. After placement Using Ostell (RFA device) ISQ values were noted for primary stability. Transmucosal abutments of 4 mm di- ameter were placed for better emergence profile and waited for 6 weeks healing time. After 6 weeks time trans mucosal healing abutments were removed and ISQ values rechecked. Implant level open tray impression cop- ings were used for impressions. Single crown splinting both abutments were cemented in place. All cases were evaluated for stability, loading time, bio materials used, prosthetic complications and difficulties during impres- sion procedures. (Fig 1-5)

Fig 1

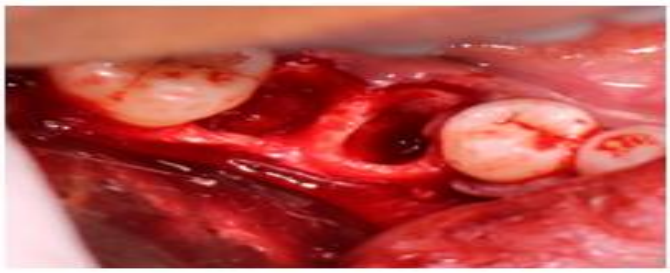


Fig 2

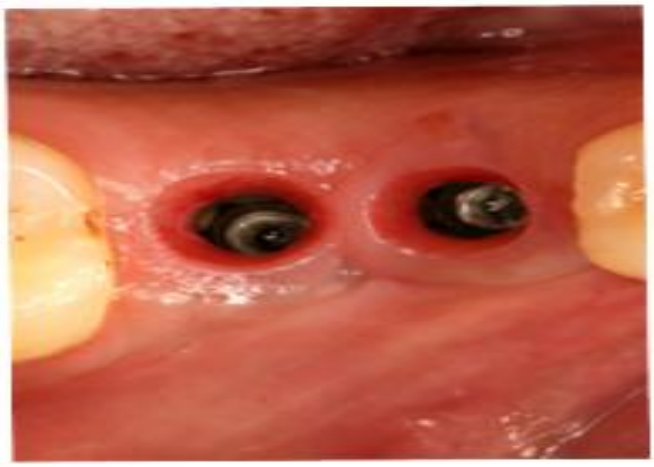


Fig 3

Fig 4

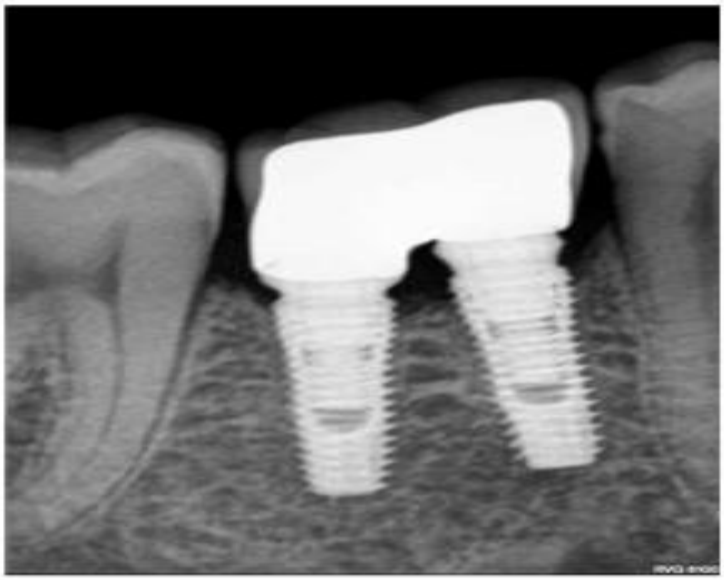


Fig 5

Group B

Atraumatic extraction of offending tooth was done . Socket was inspected for intact buccal lingual and inter radicular septum .After homeostasis wide diameter root form implants with internal hex and 6 degree conical taper connection with knife edged, wide pitch threads in narrow core offering greater primary stability were placed in the inter radicular septum of mandibular first molar. Osteotomy was performed to a diameter of 2mm in interdental septum with pilot drill and expanded up to the core diameter of 3.8 mm and implant (Megagen

Anyridge) with same core diameter but with knife edge threads up to 5 or 5.5 mm diameter were placed with an insertion torque of 40 N in implant hand piece and wrenched up to 60 N primary stability using torque controlled wrench. Implant was positioned in a mid point bucco lingually and maintaining adequate space from adjacent teeth. After placement Using Ostell (RFA device) ISQ values were noted for primary stability . The space left in the socket were grafted with alloplastic graft material ie Novabone in putty consistency. Trans mucosal abutments were placed for better emergence profile and full thickness periosteal flaps were sutured around the healing abutment of larger diameter ie 6mm. waited for 6 weeks healing time. After 6 weeks time trans mucosal healing abutments were removed and Implant level open tray impression copings were used for impressions. Single crowns were givens screw retained prosthesis .All cases were evaluated for stability, loading time, bio materials used, prosthetic complications and difficulties during impression procedures. (Fig 6-10)

Fig 6

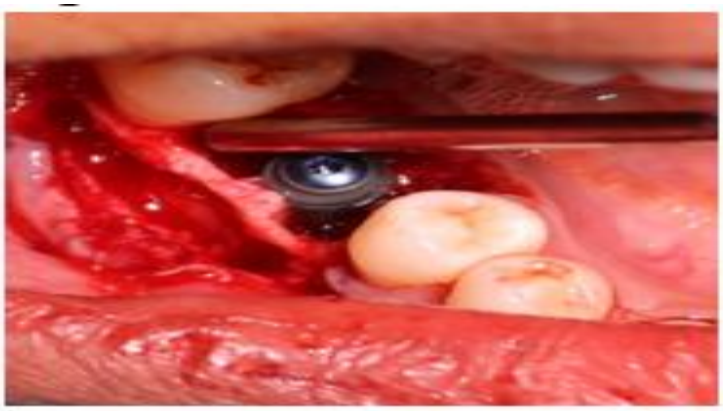


Fig 7

Fig 8

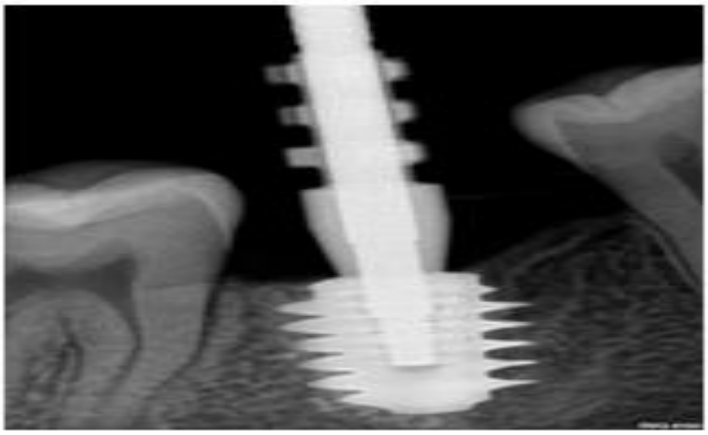


Fig 9

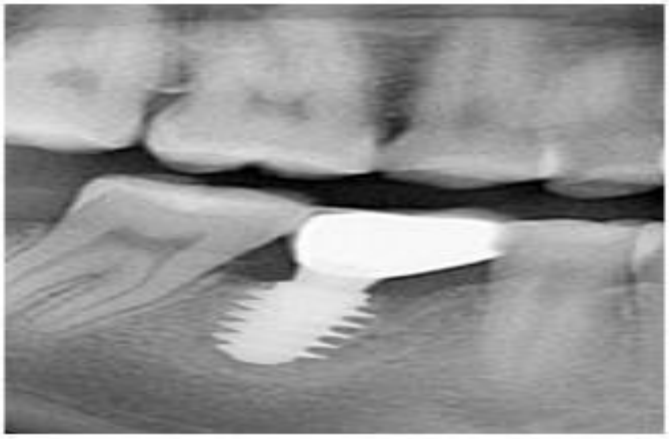


Fig 10

Prosthetic work difficulty assessment using PDI (Prosthetic Difficulty Index) Prosthetic work difficulty assessment for single mandiblular molar replacement with single or multiple implants. Each parameters assessed if present gets a value of 1 and if absent gets a value zero. And cumulative sum is noted in every case. The greater figure denotes multiple difficulties.

a) Difficulty in impression making due to convergence of implants
b) Crown seating difficulties
c) Inadequate space for crowns
d) Esthetic outcome
e) Hygiene issues in maintenance

GROUP A

CHART-1

Case No	Tooth No	Mesio distal Distance	no of implants placed	Primary stabilityof mesial implant ISQ value	Primary stabilityof distal implant ISQ value	Secondary stabilityof mesial implant ISQ value	Secondary stabilityof distal implant ISQ value	Prosthetic Difficulty Index value
1	36	11mm	2	65	68	72	74	3
2	46	12 mm	2	62	64	76	76	2
3	46	10 mm	2	63	68	78	78	4

Case No	Tooth No	Mesio distal Distance	no of implants placed	Primary stabilityof mesial implant ISQ value	Primary stabilityof distal implant ISQ value	Secondary stabilityof mesial implant ISQ value	Secondary stabilityof distal implant ISQ value	Prosthetic Difficulty Index value
4	36	11mm	2	64	66	74	76	3
5	46	12 mm	2	68	62	70	78	2
6	46	10 mm	2	68	68	76	76	4
7	46	11 mm	2	70	66	78	74	4
8	36	13 mm	2	64	68	74	73	2
9	36	10 mm	2	66	70	73	76	4
10	46	12 mm	2	66	70	75	78	2

GROUP B
CHART-2

Case No	Tooth No	Mesio distal Distance	no of implants placed	Primary stabilityof implant ISQ value	Secondary stabilityof implant ISQ value	Prosthetic Difficulty Index value
1	46	11mm	1	63	78	0
2	46	12 mm	1	64	74	1
3	46	10 mm	1	68	73	0
4	46	11mm	1	65	75	0
5	46	12 mm	1	62	75	0
6	36	10 mm	1	68	76	1
7	36	11 mm	1	65	78	0
8	36	13 mm	1	62	74	0
9	36	10 mm	1	64	73	0
10	46	12 mm	1	68	75	0

Table 1: Comparison of primary and secondary stability between the study groups A and B

Group		N	Mean	Std. Deviation	Mean Difference (95% CI)	t	df	p-value
Primary stability	A	10	66.30	1.72	1.40 (-0.55, 3.35)	1.51	18	0.15 (NS)
	B	10	64.90	2.38				
Secondary stability	A	10	75.25	1.53	0.15 (-1.42, 1.72)	0.2	18	0.84 (NS)
	B	10	75.10	1.79				

Independent sample t test
*p<0.05 statistically significant, p>0.05 Non Significant, NS

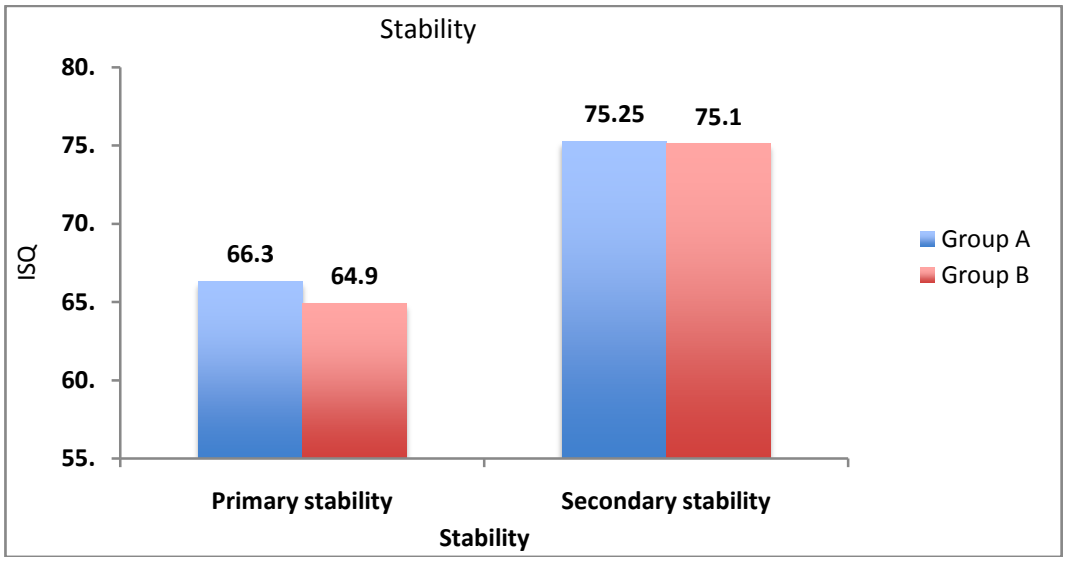
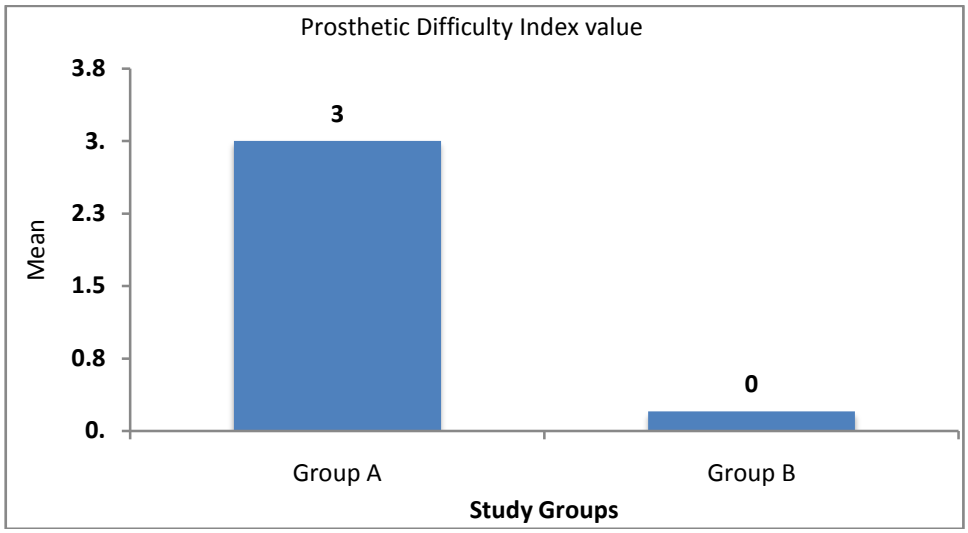


Table 2:- Comparison of prosthetic difficulty between the study group

	Group	N	Mean (SD)	Range	Median (Q1-Q3)	Mann whitney U test p-value
Prosthetic Difficulty Index value	A	10	3.00 (0.94)	2 - 4	3(2 - 4)	<0.001*
	B	10	0.20 (0.42)	0 - 1	0(0 - 0.25)	

*p<0.05 statistically significant, p>0.05 Non Significant, NS



IV. Results

The results from parameters analysed, Group A shows more frequent prosthetic difficulties compared to group B .Group B shows better feasibility for implant placement in mandibular extraction sockets with mesio distal dimension less than 12 mm due to the prosthetic easiness and less biomaterials used. As less number of implants and abutments used the cost of the treatment is much lesser for group B compared to group A. Deteriorating cantilever forces from occlusal load is also minimised due to larger diameter implants centrally placed and axi ally loaded. The primary stability derived in both the scenarios are almost same for groups so as the secondary stability and duration of treatment.

V. Discussion

Socket anatomy after the extraction of mandibular molars are highly complex, due to the varying anatomy, divergence or convergence of roots and traumatic extraction. The presence of thick buccal and lingual cortices makes it receptive for the deep threads of a larger diameter implant and can provide maximum initial stability. The available mesio-distal distance as well as bucco-lingual width of extraction socket and integrity of inter radicular septum determines the number of implants and its position. To overcome the cantilever forces falling on it , a clinician decides to place single implant in inter radicular area or to place two implants in either root sockets.When single implant given in one of the sockets and prosthesis is cantilevered and is subjected to ab- normal occlusal forces (more when para functional habits like bruxism) may lead to increased abutment screw loosening, implant/abutment fracture, and increased crestal bone loss due to mechanical overload. To overcome this, usage of two implants were in consideration [6]. An average mesio-distal dimension of 12mm or more is necessary to place two number of 3.5 to 4mm diameter regular implants in mesial and distal root sockets. The surgical protocol for placing multiple implants in the root sockets with good parallelism to each other, without following the curvature of root but doing a trans socket placement, without compromising on the distance from natural teeth and between implants each other, are very crucial and demands precision at every stage.

Alternative option is to use single implant in inter radicular bone. Its possible even in case of loss of inter radicular septum during extraction or when inter radicular septum is very thin due to convergence of roots .When using wider diameter implant especially with knife edge thread design and progressive threading pattern engaging buccal and lingual cortices it offer same primary stability as that of two implants in root sockets. [7]

Atraumatic extractions of mandibular first molars is a challenge due to the encasing of root fragments in more dense cortical plates and thin flat inter radicular septum. Removal of crown portion and splitting the roots in furcation area make it easier for its extraction and prevents expansion of buccal and lingual plates during extraction. Use of luxators and creating strategical purchase points between the roots and the socket all aid in atraumatic extraction and preservation of maximum hard and soft tissues. In case of missing mandibular first molar and retention of primary molars and retained root stumps even after extraction there will be abundance of native bone for implant placement. The cases done in such scenarios were excluded from this study.

Bahat et al. suggested methods to select the number and size of implants [8]and Balshi et al. compared the use of one implant and two implants to replace a single molar[9]. But all these studies were in healed extracttion sites. The same principles can be considered even in extraction sockets .

VI. Conclusion

This study concludes that single wider diameter implant with knife edge threads centrally placed in inter radicular area engaging buccal and lingual cortices offer same or better stability as that of multiple implants in root sockets . Single wider diameter implant offer much lesser prosthetic difficulty compared to multiple implants when mesio distal distance of extraction socket is less than 12 mm.

References

1. One DC,BleakleyJE.Compromised first permanent molars An orthodontic perspective; *Australian Dental Journal* 2010:55:2-14
2. Shenoy VK , Single tooth implants Pre treatment considerations and pretreatment evaluation; *Journal of Interdisciplinary Dentistry* 2012 Vol 2 Issue 3 Page 149-157
3. Vignoletti Fabio ,Mariano Sanz , Immediate Implants at fresh extraction sockets: From myth to reality; *Periodontol* 2000.2014 October 66(1)
4. Cristalli MP et al , Immediate loading of post extractive single tooth implants a One year prospective study; *Clin Oral Implants Res* 2015 September 26 (9)
5. Romanos GE, Present status of immediate loading of Dental implants; *Journal of Oral Implantology* 30 (3), 189-197,2004
6. Ziv Mazor et al, Replacement of a molar with two narrow diameter Dental Implants *Implant Dentistry* vol 21,Number 1, 2012
7. Gian Pietro Schincaglia, Riccardo Marzola, Giovanni Fazi Giovanni, Chiara Scapoli Chiara, Roberto Scotti Replacement of mandibular molars with single unit restorations supported by wide body implants : Immediate versus delayed loading ,A randomized controlled study *International Journal of Oral and Maxillo facial Im- plants* 23 (3), 2008
8. Oded Bahat ,Mark Handelsman. Use of wide implants and double implants in posterior jaw : A clinical report;*International Journal of Oral and Maxillo Facial Implants* 11 (3), 1996
9. Thomas J ,Balshi, Ramon E Hernandez, Maria Claudia Pryszlak, BO Rangert A comparative study of one implant versus two replacing a single molar; *International Journal of Oral and maxillofacial Implants* 11(3), 1996

Dr.Segin Chandran K R MDS (OMFS) "Comparison Of Two Different Protocols For Immediate Placement Of Dental Implants In Lower Molar Extraction Sockets With Limited Restorative Space ."IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 17, no. 4, 2018, pp 18-26.