



Fig. 2: Pocket depth measurements around the implants with locator (group I)

Fig. 3: Pocket depth measurements around main abutment for group I

and periabutment periodontium by measuring pocket depth and Table 1: Comparison of pocket depth change for both study groups from the baseline values at different time intervals

	6 m-BL	12 m-BL	18 m-BL
Mean difference	0.406	0.669	1.031
Mean% change	32.48	53.52	82.48
Paired t value	6.8	4.6	13.1
p value	0.0065*	0.0194*	0.0010*
Mean difference	0.453	0.688	1.05
Mean% change	36.24	55.04	84
Paired t value	4.01	3.3	9.2
p value	0.0274*	0.0452*	0.0027*
Mean difference	0.4	0.1	0.13
p value	0.724 NS	0.943 NS	0.896 NS

(p > 0.05)

Table 2: Comparison of pocket depth change for the study groups from the baseline values at different time intervals

	6 m-BL	12 m-BL	18 m-BL
Mean difference	0.413	0.68	0.988
Mean% change	34.41667	56.66667	82.33333
Paired t value	14.01	22.6	20.2
p value	0.0001*	0.000*	0.000*
Mean difference	0.456	0.68	1.033
Mean% change	38	56.66667	86.08333
Paired t value	5.898	9.830	14.12
p value	0.000*	0.000*	0.000*
Paired t value	0.2419	0.0298	0.1278
p value	0.810 NS	0.976 NS	0.899 NS

*Significant (p < 0.05)
NS, nonsignificant (p > 0.05)

Fig. 4: Pocket depth measurements around implant (group II)

increase in the pocket depth in both groups when compared to baseline. The difference and subsequent measurements in the pocket depth were statistically significant in both the study groups (p < 0.05).

Intergroup comparison was conducted using a paired sample t test. It was observed that the increase in pocket depth from baseline to the subsequent measurements was higher in the BS group than the locator group. This difference was not statistically significant (p > 0.05).

Table 2 depicts the changes in the pocket depth around the main abutment in both the groups, and results similar to those around the implant were observed. The intragroup comparison showed a statistically significant increase in the pocket depth as compared to baseline in both the groups. However, no statistical significance was observed in intergroup comparison.

Gingival Index

The result of the gingival index is summarized in Figure 1. A statistically significant rise in the mean index value over time was observed in both the study groups (p < 0.05). The intergroup comparison revealed higher index values in the locator group as compared to the BS group. However, this difference was not statistically significant (p > 0.05).

DISCUSSION

The present study was conducted to evaluate and compare the effect of locator and BS attachment systems on the periodontium and gingival index in Kennedy class I cases. There was an increase in the pocket depth as well as worsened gingival index in both the study



the most popular of all attachments. The advantages of BS attachments include low cost, ease of handling, less chairside time and versatility that permits usage in both root and implant-supported RPDs.

The locator attachment system requires a minimum of two implants. It has several beneficial features such as resilience, improved retention, durability, low vertical profile for use in cases with reduced interarch space, pivoting action of the metal housings over the male inserts, and built-in angulation compensation. Improved patient satisfaction has been reported with the use of locator system due to its ease of removal and insertion. These studies have also reported that patients with locator-retained RPDs have a better oral health-related quality of life than patients with complete dentures.^{20,31} However, it has also been observed that the retention of such RPDs diminishes over time and warrants regular maintenance.³²

Fig. 5: Comparison between gingival index difference in both groups

groups. The worsening of the periodontium was higher in the BS group when compared to the locator group; however, the difference between the two groups was not statistically significant. Hence, the null hypothesis is accepted (Fig. 5).

Kennedy class I is one of the most commonly encountered cases clinically. Due to the problem of support and stability, these cases also pose a challenge to the clinician. Here, all the selected patients in the study belonged to this classification. Also, the patients had a limited interarch space between the upper and lower arches in the area of the free end saddle. Determination of the interarch limitation was achieved through mounting the upper and lower casts on an articulator.

In this study, the dental implants were placed distally in the first or second molar area. This was done to transform the class II situation to a class III situation, which is more favorable clinically and easier to manage as proven by previous studies on implant-supported distal extension RPDs.^{15,16} Additionally, it has been theorized that for maximum support, the implants should be located as distally as possible. This distal placement ensures the stabilization of the prosthesis in a vertical direction and diminishes the rotational stress transferred to the abutment teeth.^{17,18}

A two-stage implant technique was used in this study to reduce the risk of bacterial infection, prevent apical migration of epithelium along the body of the implant, and decrease the risk of loading the implant early. 3 months healing period was allowed after denture installation and before partial denture construction to ensure successful osseointegration.¹⁹

Although several studies³ showed no significant difference between the early and delayed implant loading in mandibular overdentures, the outcomes of long-term clinical studies^{24,26} using both the dental implant and the natural abutment as compared to a delayed loading protocol implies successful osseointegration with the BS attachment. It occurs when implants placed in the mandible were not loaded for at least 3 months. Accordingly, a similar protocol was used for the present study.

Fixed reference points (midbuccal, midlingual, middistal, and midmesial) were used for measuring changes in pocket depth for standardization. These points were used to measure the actual pocket depth changes resulting from apical migration of the epithelial attachment and not from false pocket due to gingival enlargement.²⁷

A wide variety of commercially available attachment systems are used to connect implants to overdentures. Ball attachments are among

In the present study, the difference in the pocket depth and the mean gingival index between the locator and the BS group was not statistically significant. The BS is the most widely used attachment system; hence, this comparison proves the locator system is an equally good attachment system. Also, it is of advantage in cases with a reduced interarch space due to its low vertical profile. The difference in the measured parameters was not statistically significant; yet, clinically, the values were lower for the locator group. This difference could have been due to the slight difference in the resiliency of the two systems. Schmalz and Chikunov et al.³⁴ have reported that the locator system is a resilient attachment that helps to rectify the divergence between the dental implants carrying an overdenture and allows better stress distribution. Though not statistically significant, the gingival index values were also lower in the locator group as compared to the BS group. This could be attributed to the ease of removal and insertion of locator-based RPDs. It has been reported that no specific manual skills are required to remove locator-based RPDs for cleaning, and poor oral hygiene is the main culprit in causing gingivitis.²⁸

The present study was conducted using the clinical measures of periodontal disease. Further research by measuring the amount of distal bone loss is recommended. Also, the results of the present study might have been nonsignificant due to the smaller sample size. Hence, a larger sample size with other attachment systems can be compared to understand the best-suited attachment system for distal extension implant-supported removable partial dentures.

CONCLUSION

Within the limitation of the results of this study, it could be concluded that the implant-supported partial overdenture restored a ball signi cant, pocket depth and gingival index scores around both the dental implant and the natural abutment as compared with the BS attachment.

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