

A Clinical Comparison of Prosthetic Complications of Implant-Supported Overdentures With Different Attachment Systems

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Most industrialized countries are experiencing a rapid decline in tooth loss. However, tooth loss increases with age, so that the number of edentulous people within these societies will continue to increase for several decades because of the increase in mean age.¹ One of the main challenges faced by dentists has been the ability to replace missing teeth to the satisfaction of their patients. The problem of missing teeth is compounded when all teeth are lost either to disease or simply old age.² Complete maxillary and mandibular dentures have been the traditional standard of care for edentulous patients for more than a century. Complete denture wearers are usually able to wear an upper denture without problems, but may struggle to eat with a complete lower denture because it is too mobile.¹

Many of the problems reported by conventional complete denture wearers can be eliminated when implants are used to support fixed prostheses or removable overdentures.³ Overdentures are basically dentures that are placed over any existing teeth or even tooth roots that have the advantage of being integrated into the bone.² A number of reported longitudinal studies confirm the effectiveness of this treatment in the

Objectives: The objective of this clinical study was to evaluate the prosthetic complications of patients with 2 to 4 implants splinted with a round bar or with 2 to 4 unsplinted implants with ball attachments during the follow-up period.

Methods: A total of 26 patients were included in this study. Patients were randomly provided with a round bar or with ball attachments that were used to retain overdentures. During follow-up visits, the following prosthetic complications were recorded: round bar fracture, fractured overdenture, hygiene complications, abutment screw loose, worn O-ring or replacement of O-ring attachment, and fractured retention clip. The functioning

period of overdentures in the round bar group ranged from 12 to 72 months (mean 49), and from 12 to 40 months (mean 23) in the ball attachment group.

Results: A total of 20 prosthetic complications were recorded in both groups. No differences in prosthetic complications were observed for 2 attachment systems.

Conclusion: Implant-supported overdentures with bar or ball attachments may be considered to be reliable methods in the treatment of the edentulous individuals. (*Implant Dent* 2008;17:74–81)

Key Words: dental implants, overdenture, bar attachment, ball attachment, prosthetic complications

mandible,^{4,5} even in patients with severe alveolar bone loss,⁶ but results in the maxilla have been mixed.^{7,8}

It has already been established through longitudinal clinical studies, structured reviews, and consensus conferences, that the survival of root form titanium implants is very high in the anterior mandible and that the incidence of surgical complications is very low. Furthermore, it has been shown that implants reduce the rate of resorption of the residual ridge in the anterior mandible.¹ An implant overdenture provides stability of the prosthesis, and patients are able to reproduce a determined centric occlusion.⁹

The chewing efficiency with an overdenture is improved by 20% when compared with a complete denture.¹⁰

The maximum occlusal force of a denture patient may improve 300% with an implant-supported prosthesis.¹¹

Atrophy of the edentulous maxilla limits the opportunities for implant placement, and because of fine and delicate trabecular bone with a thin or even absent cortical plate, it is considered unpredictable for stabilizing and supporting dental implants.¹² Close proximity of the maxillary sinus may further complicate maxillary implant treatment in the posterior region, and extensive reconstructive procedures are often needed before implant placement.¹³ In these situations, inserting 4 implants in the anterior region of maxilla and fabricating an implant-supported overdenture may be a good treatment option.

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Ball and bar attachments are 2 main systems for retention in implant-supported overdentures. There are very few comparative studies regarding their clinical outcomes and the possible complications of these 2 different attachment systems.¹⁴

The objective of this clinical study was to evaluate the prosthetic complications of the patients with 2 to 4 implants splinted with round bar or with 2 to 4 unsplinted implants with ball attachments.

MATERIALS AND METHODS

A total of 26 patients with edentulous mandibles and maxillae, who received prosthetic treatments between 1998 and 2005, were included in this study. At the beginning of treatment, all patients had conventional dentures. Preoperative clinical and radiographic examinations were carried out and dental-medical conditions evaluated. Patients with serious systemic diseases were excluded. The preoperative examination included panoramic radiographs and clinical examination for the assessment of bone volume and shape. For selection of arch shapes, preoperative models were used; according to Izards arch shape classification patients were divided into 2 groups.¹⁵ Patients with U-shaped arches had 2 implants and patients with V-shaped arches received 4 implants in their mouth. Implants were placed according to the manufacturer's surgical protocol. A total of 78 implants were placed (Table 1). Two failures occurred in the healing period. In this case, the areas were regrafted and implants placed after 3 months of healing. The implant system was chosen randomly, but each patient received only 1 system. After 2 to 4 months of healing, all patients received implant-supported overdenture prostheses. Patients were randomly provided with a round bar or with ball attachments, which were used to retain overdentures. The round-bar group consisted of 10 patients (3 men, 7 women), ranging in age from 48 to 79 years (mean 59 years), having 38 implants. The ball-attachment group consisted of 16 patients (6 men, 10 women), ranging in

Table 1. Characteristics of Study Population

Patient	Gender	Age (y)	Follow-Up (mo)	System	No. Implant	Type of Attachment
1	Male	59	17	Camlog	4	Ball
2	Female	68	44	ITI	2	Ball
3	Male	60	12	ITI	2	Ball
4	Female	58	24	ITI	2	Ball
5	Female	59	10	ITI	2	Ball
6	Female	62	60	MIS	2	Bar
7	Male	53	17	MIS	2	Bar
8	Female	65	65	MIS	2	Bar
9	Male	64	24	Frialit	4	Bar
					4	Bar
10	Female	74	28	ITI	2	Ball
11	Male	43	8	ITI	4	Bar
					4	Ball
12	Female	55	75	Frialit	2	Bar
13	Male	59	14	ITI	2	Ball
14	Female	47	52	Camlog	2	Ball
15	Male	70	32	Camlog	2	Ball
16	Male	64	72	Frialit	4	Ball
17	Female	50	17	Mis	2	Bar
18	Male	64	38	ITI	2	Ball
19	Female	65	27	Camlog	2	Ball
20	Female	58	10	Camlog	4	Bar
21	Female	60	49	ITI	2	Ball
22	Female	62	39	ITI	2	Ball
23	Male	53	40	ITI	4	Ball
24	Male	55	44	ITI	2	Bar
25	Female	62	27	ITI	4	Bar
26	Female	69	25	ITI	2	Ball
					4	Bar

Camlog—ALTATEC GmbH, Wirsheim, Germany; MIS—Medical Implant System, Shlomi, Israel; ITI—Institut Straumann AG, Switzerland; Frialit-2—Dentsply Friadent Ceramed, Germany.

age from 44 to 66 years (mean 54 years), having 40 implants.

A bilaterally balanced occlusion concept was applied to all overdentures. The occlusion was controlled to prevent discrepancies. The patients were recalled for clinical examinations at 3, 6, and 12 months and annually thereafter. The functioning period of overdentures in the round bar group ranged from 12 to 72 months (mean 49), and from 12 to 40 months (mean 23) in the ball-attachment group. During follow-up visits, the following prosthetic complications were recorded: round bar fracture, fractured overdenture, hygiene complications, abutment screw loose, worn O-ring or replacement of O-ring attachment, and fractured retention clip.

RESULTS

The healing period was completed without any complication, except for 2 implants in one case. In this case, implants were explanted and the areas

were regrafted. After 3 months of healing, 2 implants were placed. After the healing period, all implants were loaded. Patient satisfaction was found to be similar with both retentive systems. All patients in both groups were more comfortable after treatment than before. Phonetic problems that were initially seen disappeared after a short adaptation period. One of the patients in the ball-attachment group wanted to have a fixed prosthesis because of dissatisfaction with the treatment. Prosthetic complications occurred during the follow-up period are given in Table 2. Most of the prosthetic complications were related to the deformation of ball sockets and retention of ball clips in the ball-attachment group. In the bar-attachment group, because of the difficulties in cleaning the peri-implanter zone, perimucositis were detected in some of the cases and by periodic follow-ups there was a slight decrease in hygiene problems after a year in function.

Table 2. Prosthetic Complications Recorded During Follow-Up Period

Complications	Number of Complications	
	Ball Attachment Group	Bar-Attachment Group
Round bar fracture	—	2
Fractured overdenture	3	1
Hygiene complications	1	4
Retention clip activation or O-ring replacement	4	—
Abutment screw fracture	1	2
Fractured retention clip	2	—

DISCUSSION

The oral rehabilitation of edentulous patients with mild to severe residual ridge resorption has been greatly improved because of implant dentistry. Since the middle of the 1980s, implant-supported overdentures have become a rapidly expanding and a successful treatment alternative in the rehabilitation of complete edentulism because of simple laboratory procedures and cost effectiveness.¹⁴ Ball attachments and bar attachments are 2 main retainer systems for implant-supported overdentures, but very few studies have compared their clinical outcomes and prosthetic complications that occurred during the follow-up period.^{16,17}

Timmerman *et al* reported an 8-year randomized controlled trial wherein 3 groups of edentulous participants with atrophic mandibles wore 3 types of implant overdentures. One group received an implant-retained overdenture on 2 implants with ball attachments (group 1); 1 group received an implant-retained overdenture on 2 implants with a single bar (group 2); and the final group wore an implant-retained overdenture on 4 implants with a triple bar (group 3). Forty-six-item questionnaire was completed in 19 months and 8 years after delivery of the prosthesis.¹⁸ This study shows that having more than 2 implants does not lead to a more satisfied individual in terms of retention and comfort and social function. The results of this study suggest that a mandibular overdenture retained by 2 implants interconnected with a single bar might be an adequate treatment option with proven stability in the long term.

In a prospective study of Payne and Solomons, they evaluated the hypothesis that mandibular implant-supported overdentures using more

than 2 implants splinted with multiple round bars would need unnecessary prosthodontic maintenance. Fifty-nine consecutive completely edentulous patients had implants placed in the anterior mandible, and were divided into 3 design groups as follows: 2 implants to receive an unsplinted overdenture design (design 1), 2 implants to receive a splinted overdenture design using 1 round bar (design 2), and 3 or 4 implants to receive a splinted overdenture splinted with 2 or 3 round bars (design 3).¹⁹ They suggested that the quantity of prosthodontic maintenance in design 3 would be greater than that in designs 1 and 2, but it did not occur.¹⁹ And the prospective results indicate that 3 to 4 implant-supported multiple round bar overdentures may successfully be used in edentulous patients. There was no significant difference in retentive clip activation or retentive clip fractures among 3 design types.¹⁹

Other study groups compared patient satisfaction in groups of patients with either bar- or ball-attachment and found a comparable level of patient satisfaction among their groups.^{20,21}

Naert *et al* reported on patient satisfaction after 5 years among 3 groups of patients who received bar-clip, ball-attachment, or magnet attachments. Although patients in the magnet group stated that they would have preferred a more retentive attachment system, patient satisfaction among the groups was in the middle.²²

Other aspects should also be considered. Short-term results indicate that ball- and bar-retained overdentures on 2 implants result in better maximum bite force, chewing efficiency, clinical performance, maintenance, and repair re-

quirements than a complete traditional denture.^{23,24}

In a comparative 5-year study, Gotfredsen and Holm evaluated peri-implant conditions and maintenance requirements, and found 100% survival rate for 2 implants bar- and ball-retained overdentures. They found no difference in bone loss or health of mucosa but more technical complications and repairs in overdentures with bar attachments than ball attachments.²⁵

van Kampen *et al* showed that functional maintenance complications related to the attachments were observed in magnet and ball-attachment only during 3-month evaluation period, and the bar-clip attachment showed no maintenance problem. They concluded that variation in the necessary amount of maintenance with respect to ball attachment is largely caused by a variation in characteristics of the ball abutments and matrixes that are used.²⁶

According to the present study, most of the patients were more comfortable after treatment than before treatment, and all of them reported that their functional, phonetic, and chewing abilities improved. And we found no difference in prosthetic complications and repairs among both groups. The main complications in the bar-attachment group were hygiene complications because of narrow space between bar and mucosa. According to our patients in the bar-attachment group, it is very difficult to clean the periabutment zone. But after a year in function, they developed their cleaning skills and such problems have disappeared. In the ball-attachment group, overdenture fracture and retention loss were the major complications. Retention loss depends on variation of the implant systems. In our study, 4 different implant systems were used and all systems had different matrix and patric components. The type of attachment system in the ball-attachment group could affect the retention loss and complications caused by retention matrix. Also, a lack of parallelism of implants could create retention loss because of wear in the matrix part. van Kampen *et al*²⁶ observed that all retention complications occurred in subjects where the implants were not perfectly parallel to each other. Overdenture fracture could have occurred because of the lack of

parallelism of implants in the current study.

It has been stated that implants planned for use with overdentures must be parallel to one another to obtain attachment retention and prevent premature wear or fatigue of the involved components.²⁷ Many clinicians assume that ball attachments cannot be used when implants are not parallel, and they will attempt to use angled abutments, flexible attachments, and bar-clip assemblies to compensate in these kind of situations.¹⁷

CONCLUSION

There is a consensus that implant-supported overdenture should be the first choice of care for edentulous individuals. Implant-supported overdentures are effective in reducing a wide range of denture complaints. Patients strongly preferred implant-supported overdentures with bar- or ball-attachment systems over conventional complete dentures. These 2 attachment systems make patients feel more secure. Implant system, implant position, parallelism of implants, arch shape, initial costs, and costs for repair are main parameters for choosing the type of attachment systems. Some of these parameters can also cause prosthetic complications in long-term. Further studies are required to determine the influence of these parameters on prosthetic complications of implant-supported overdentures over longer follow-up periods.

Disclosure

The authors claim to have no financial interest in any company or any of the products mentioned in this article.

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Ein klinischer Vergleich der prothetischen Komplikationen bei Implantatgestützten Prothesenüberbauten unter Verwendung unterschiedlicher Stützzahnsysteme

ZUSAMMENFASSUNG: Zielsetzungen: Die vorliegende klinische Studie zielte darauf ab, die möglichen prothetischen Komplikationen bei Patienten mit 2 bis zu 4 mit Hilfe einer runden Schiene gestützten Implantaten bzw. mit 2 bis zu 4 ungeschienten Implantaten mit Ballstützanbringungen im Verlauf des Nachsorgezeitraums. **Methoden:** Insgesamt 26 Patienten nahmen an der Studie teil. Nach dem Zufallsprinzip wurden die Patienten mit einer runden Schiene oder mit Ballstützapparaturen ausgestattet, die zum Halten der Deckprothese eingesetzt wurden. Während der Nachsorgetermine wurden die nachfolgenden prothetischen Komplikationen offenbar: Fraktur der Rundschiene, gebrochene Deckprothese, hygienische Komplikationen, Lockerung der Stützzahnschrauben, abgenutzter O-Ring oder Ersetzung der O-Ringbefestigung sowie gebrochener Haltclip. Die Funktionsdauer der Deckprothesen bei der mit Rundschiene ausgestatteten Gruppe belief sich auf 12 bis 72 Monate bei einem Durchschnitt von 23 Monaten sowie auf 12 bis zu 40 Monate mit einer durchschnittlichen Dauer von 23 Monaten bei der mit Ballbefestigung ausgestatteten Versuchsgruppe. **Ergebnisse:** In beiden Gruppen wurden insgesamt 20 prothetische Komplikationen aufgezeichnet. Es wurden keine Unterschiede bezüglich der zwei unterschiedlichen Befestigungslösungen in Bezug auf die prothetischen Komplikationen festgestellt. **Schlussfolgerung:** Implantatgestützte Deckprothesen mit Schienen- oder Ballbefestigung können als verlässliche Methoden bei der Behandlung zahnloser Patienten angesehen werden.

SCHLÜSSELWÖRTER: Zahnimplantate, Deckprothese, Schienenbefestigung, Ballbefestigung, prothetische Komplikationen

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Una comparación clínica de las complicaciones protéticas de sobredentaduras apoyadas con implantes con diferentes sistemas de sujeción

ABSTRACTO: Objetivos: El objetivo de este estudio clínico fue evaluar las complicaciones protéticas de pacientes con 2 a 4 implantes entablillados con una barra redonda o con 2 a 4 implantes sin entablillar con accesorios de bolas durante el período de seguimiento. **Métodos:** Se incluyeron un total de 26 pacientes en este estudio. Los pacientes recibieron al azar un accesorio con barra redonda o con bolas que se usaron para retener las sobredentaduras. Durante las visitas de seguimiento, se anotaron las siguientes complicaciones protéticas; fractura de la barra redonda, sobredentadura fracturada, complicaciones higiénicas, tornillos flojos del pilar, juntas tóricas gastadas o reemplazo de la junta tórica y traba de retención fracturada. El período de funcionamiento de las sobredentaduras en el grupo de la barra redonda varió entre 12 a 72 meses (término medio 49) y desde 12 a 40 meses (término medio 23) en el grupo de la bola. **Resultados:** Se anotaron un total de 20 complicaciones protéticas en ambos grupos. No se notaron diferencias en las complicaciones protéticas en los dos sistemas de sujeción. **Conclusión:** Las sobredentaduras apoyadas con implantes con barras o bolas podrían ser consideradas métodos confiables en el tratamiento de los individuos edentulosos.

PALABRAS CLAVES: Implantes dentales, sobredentadura, accesorio de barra, accesorio de bola, complicaciones protéticas

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Comparação clínica das complicações protéticas de sobredentaduras suportadas por implantes com sistemas de attachment diferentes

RESUMO: Objetivos: O objetivo deste estudo clínico era avaliar as complicações protéticas de pacientes com 2-4 implantes esplintados com uma barra redonda ou com 2-4 implantes não-esplintados com attachments em forma de esfera durante o período de acompanhamento. **Métodos:** Um total de 26 pacientes neste estudo. Os pacientes receberam aleatoriamente uma barra redonda ou attachments em forma de esfera que foram usados para reter as sobredentaduras. Durante visitas de acompanhamento, as seguintes complicações protéticas foram registradas: fratura da barra redonda, sobredentadura fraturada, complicações higiênicas, afrouxamento do parafuso de suporte, O-ring gasto ou substituição do attachment do O-ring e grampo de retenção fraturado. O período de funcionamento das sobredentaduras no grupo da barra redonda foi de 12 a 72 meses (média 49) e de 12 a 40

meses (média 23) no grupo de attachment em forma de esfera. **Resultados:** Um total de 20 complicações protéticas foi registrado em ambos os grupos. Nenhuma diferença em complicações protéticas foi observada para dois sistemas de attachment. **Conclusão:** As sobredentaduras suportadas por implante com attachments em forma de barra ou esfera podem ser consideradas como métodos confiáveis no tratamento dos indivíduos desdentados.

PALAVRAS-CHAVE: Implantes dentários, sobredentadura, attachment em forma de esfera, complicações protéticas

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Клиническое сравнение протезных осложнений съёмных зубных протезов, удерживаемых имплантатами, с различными системами креплений

РЕЗЮМЕ. Цели. Цель данного клинического исследования — оценить протезные осложнения у пациентов с 2–4 имплантатами, шплинтованными с помощью стержня круглого сечения, или с 2–4 нешплинтованными имплантатами с шаровыми креплениями во время последующего наблюдения врача. **Методика.** В исследовании принимало участие в общей сложности 26 пациентов. Пациентам случайным образом были предоставлены крепления на стержне круглого сечения или шаровые крепления, используемые для фиксации зубных съёмных протезов. Во время последующих приемов у врача наблюдались следующие протезные осложнения: поломка стержня круглого сечения, сломанный съёмный зубной протез, гигиенические осложнения, расшатанность винта супраструктуры, изношенность уплотнительного кольца круглого сечения или замена уплотнительного кольца круглого сечения и сломанный фиксирующий зажим. Период функционирования съёмных зубных протезов в группе с креплениями на стержне круглого сечения составил от 12 до 72 месяцев (в среднем 49) и от 12 до 40 месяцев (в среднем 23) — в группе с шаровыми

креплениями. **Результаты.** В обеих группах было отмечено в общей сложности 20 протезных осложнений. Протезные осложнения не отличались в группах с двумя системами крепления. **Вывод.** Съёмные зубные протезы, удерживаемые имплантатами со стержневыми или шаровыми креплениями, можно считать надежным методом, используемым для лечения при адентии.

КЛЮЧЕВЫЕ СЛОВА: зубные имплантаты, съёмный зубной протез, стержневое крепление, шаровое крепление, протезные осложнения

TURKISH / TÜRKÇE

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Değişik ataşman sistemli, implantla desteklenen overdenture'lerde protez komplikasyonlarının klinik karşılaştırması

ÖZET: Amaç: Bu klinik çalışmanın amacı, takip süresi boyunca 2–4 adet implantı yuvarlak bar ile splintlenmiş hastalarla, 2–4 adet küresel ataşmanlı splintlenmemiş implantı olan hastalarda protez komplikasyonlarını değerlendirmektir. **Yöntem:** Bu çalışmaya toplam 26 hasta dahil edildi. Hastalar, rasgele olarak overdenture'lerin desteği için yuvarlak bar ya da küresel ataşmanların kullanıldığı gruplara ayrıldı. Takip ziyaretlerinde şu protez komplikasyonları kaydedildi: yuvarlak bar kırığı, overdenture'de kırık, hijyen komplikasyonları, abutman vidasının gevşemesi, eskimiş O-halkası veya O-halka ataşmanının yenilenmesi ve destek klipinin kırığı. Yuvarlak bar grubunda overdenture'lerin fonksiyonel süresi 12 ile 72 ay arasında (ortalama 49 ay) değişirken, küresel ataşman grubunda bu süre 12 ile 40 ay (ortalama 23) arasında idi. **Bulgular:** Her iki grupta toplam 20 protez komplikasyonu kaydedildi. İki ataşman sistemi arasında protez komplikasyonları açısından farklılık saptanmadı. **Sonuç:** Bar ya da küresel ataşmanlı implant ile desteklenen overdenture'ler, dişsiz bireylerin tedavisinde güvenilir yöntemler arasındadır.

ANAHTAR KELİMELELER: Dental implantlar, overdenture, bar ataşman, küresel ataşman, protez komplikasyonları

JAPANESE / 日本語

異なるアタッチメントシステムを使用したインプラントサポートオーバーデンチャの補綴併発症臨床比較

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研究概要: 目的: 当臨床調査ではラウンドバーでスプリントした2本から4本のインプラントを装着した患者と、ボールアタッチメントでスプリント無し2本から4本のインプラントを装着した患者のフォローアップ期間中に発生した補綴併発症評価を目的とした。

研究方法: この調査には総計26名の患者が参加した。患者にはオーバーデンチャを維持するためにラウンドバーまたはボールアタッチメントを任意提供した。フォローアップ期間中の診断では次の併発症が記録された: ラウンドバー破損、オーバーデンチャ破損、口内衛生併発症、アバットメントスクリュー弛緩、リング摩耗またはリングアタッチメント交換、リテンションクリップ破損の以上である。ラウンドバー使用グループのオーバーデンチャ機能期間は12ヶ月から72ヶ月(平均49ヶ月)を記録し、これに対しボールアタッチメント使用グループでは12ヶ月から40ヶ月(平均23ヶ月)を記録している。

結果: 両グループで合計20ケースの併発症が記録された。双方のアタッチメントシステムで観察した補綴併発症に相違点は見られなかった。

結論: バーまたはボールアタッチメントを使用したインプラント支台オーバーデンチャは無歯症患者に信頼性のある治療法として考慮に入れることができる。

キーワード: デンタルインプラント、オーバーデンチャ、バーアタッチメント、ボールアタッチメント、補綴併発症

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CHINESE / 中国語

含不同附連系統的植體支持覆蓋式義齒贗復併發症的臨床比較

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摘要: 目的: 本臨床研究旨在評估具有 2-4 顆以一個圓桿夾板固定植體、或 2-4 顆以球狀附連無夾板固定植體的患者在追蹤期間的贗復併發症。**方法:** 合計 26 名患者參與本研究。隨機提供患者一個圓桿或球狀附連來固定覆蓋式義齒。在追蹤訪視當中, 記錄到下列贗復併發症: 圓桿斷裂、覆蓋式義齒斷裂、衛生併發症、支柱牙螺釘鬆脫、O 形環磨損或更換 O 形環附連以及固定夾斷裂。圓桿組的覆蓋式義齒作用期間從 12 至 72 個月(平均 49 個月), 球狀附連組則從 12 至 40 個月(平均 23 個月)。**結果:** 兩組合計記錄了 20 種贗復併發症。研究並未發現兩種附連系統有贗復併發症的差異。**結論:** 使用桿狀或球狀附連系統的植體支持覆蓋式義齒可視為缺牙患者治療的可靠方法。

關鍵字: 牙科植體、覆蓋式義齒、桿狀附連體、球狀附連體

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임플란트 지지 피개의치의 인공 보철물과 기타 부착된 시스템의 합병증 임상 비교

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초록: 목적: 본 임상시험은 추적 기간 중 라운드 바로 부목을 대 2-4개의 임플란트를 한 환자들과, 공 부착으로 부목을 대지 않고 2-4개의 임플란트를 한 환자들의 인공 보철물에 대한 합병증을 평가하는데 목적이 있었다. **방법:** 본 시험에 참가한 환자는 총 26명이었다. 피개의치를 유지하는데 사용되었던 라운드 바나 공 부착을 한 환자들 가운데 무작위로 환자들이 선정되었다. 추적 방문 기간 동안 다음의 보철물 합병증이 기록되었다: 라운드 바 골절, 골절된 피개의치, 위생 합병증, 가공의치 나사 헐거움, O링이 닳거나 O링 부착물 교체 및 골절된 유지 클립. 라운드 바 군의 피개의치 사용 기간은 12-72개월 (평균 49개월) 이었고, 공 부착 군은 12-40개월 (평균 23개월)이었다. **결과:** 두 개 군에서 총 20건의 보철물 합병증이 기록되었다. 두 가지 부착 시스템에서 보철물로 인한 합병증의 차이는 목격되지 않았다. **결론:** 바 또는 공 부착의 임플란트 지지 피개의치는 무치악인 환자 치료를 위해 신뢰할만한 방법으로 고려할 수 있다.

핵심 단어: 치과용 임플란트, 피개의치, 바 부착, 보철물 합병증

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