Komunikacija između doktora dentalne medicine i Zubnih tehničara tijekom izrade mobilne djelomične proteze u pokrajini Khartoum, Sudan

Communication Between Dentists and Dental Technicians During the Fabrication of Removable Partial Dentures in Khartoum State, Sudan

Introduction

The goals of removable partial denture treatment are to restore esthetics and function, and preserve the remaining oral structures (1-4). To help achieve these goals, the prostheses should be appropriately designed and instructions regarding their construction should be accurately communicated to the dental laboratory technician (5). The important constituents of prosthodontic treatment are the design and prescription of prostheses, which should be implemented with regard to biological and mechanical factors (6). This information should then reach the dental technician in the form of a written work authorization (7). A written work authorization acts as a legal document for both dentists and dental laboratory technicians, and should therefore be decipherable, clear, brief, and easily understood by technicians. Inadequately de-
Rezultati dosadašnjih istraživanja u nekoliko zemalja u proteklih 30 godina upućuju na nedostatke u postupcima oblikovanja i pri izradi različitih vrsta proteza u ordinacijama dentalne medicine, posebno onih mobilnih parcijalnih od slitine kobalt-kroma (8 – 15). Zbog toga neke zemlje propisuju etičke i zakonske smjernice u kojima se zahtijeva od kliničara adekvatno oblikovanje proteza i komuniciranje sa zubnim tehničarom o njihovim značajkama (8). Pretpostavlja se da će te etičke i pravne smjernice poboljšati stanje. No neka istraživanja provedena u Velikoj Britaniji i Irskoj pokazuju da problem i dalje nije riješen (16, 17).

Svrha ovog istraživanja bila je analizirati kvalitetu komunikacije između doktora zubne medicine i zubnih tehničara u vezi s mobilnim djelomičnim protezama u Sudanu jer nema jasne odredbe koja upućuje na odgovornost terapeuta u odobravanju izrade bilo kojeg stomatološkog rada. Istraživanje koje ocjenjuje kvalitetu komunikacije između doktora zubne medicine i zubnih tehničara može upozoriti na potreba poboljšanja i može pridonijeti kako bi protetičkih radova u Sudanu.

Materijali i metode

Obavljena je deskriptivna analiza poprečnog presjeka slučajeva s mobilnim parcijalnim protezama izrađenima u registiranim privatnim zubnim laboratorijima u pokrajini Khartoumu koji su opremljeni uređajima za djelomično-uključenim protezama od kobalt-kroma. Privatni laboratoriji izvan te pokrajine nisu mogli biti uključeni jer o njima nije bilo nikakvih relevantnih zapisa u Ministarstvu zdravstva.

Uključeni su svi slučajevi koji su poslani u odabrane dentalarne laboratorije kako bi se izradio RPD, a isključeni su oni za koje je izrađen bilo koji nadomjestak, osim RPD-a. Veličina uzorka određena je sljedećom formulom:

\[ n = \frac{z^2 pq}{d^2} \]

pri čemu je \( n \) veličina uzorka, \( z \) interval pouzdanosti od 1,96, a \( p \) je 5,5% na osnovi rezultata prethodnog istraživanja [12], \( q \) je 1-p, a \( d \) granica pogreške od 5%. Time je dobivena veličina uzorka od 80. Zatim je izračunata veličina uzorka za svaku vrstu RPD-a, tj. za protezu od kobalt-kroma (CC) i za akrilatnu (A) djelomičnu protezu, prema ukupnom prosjeku broja slučajeva u mjesecu:

\[ n = \text{prosjek broja slučajeva (CC)/mjesec} \times \frac{\text{ukupna veličina uzorka ukupan prosjek broj slučajeva (A & CC)/mjesec}}{\text{RPD od kobalt-kroma}} \]

\[ = \frac{26 \times 80}{190} = 11 \text{ slučajeva} \]

\[ \text{Akrilatni RPD} = \frac{163 \times 80}{190} = 69 \text{ slučajeva} \]

Iz toga je dobivena konačna veličina uzorka od 11 CC-RPD-a i 69 A-RPD-a. Veličina uzorka iz svakoga zubnog lazelled work authorizations can lead to prostheses that are inappropriately designed and may harm the patients’ remaining oral structures (6,8).

Findings of previous studies in several countries over the past 30 years indicate shortcomings in the design and fabrication procedures of different types of prostheses in general dental practice, especially cobalt-chromium removable partial dentures (8–15). This has led some countries to stipulate ethical and legal guidelines that require the clinician to adequately design prostheses and communicate these design features to the technician (8). It was hoped that these ethical and legal guidelines would have led to an improvement. However, some studies carried out in the UK and Ireland indicated that the problem still persists (16,17).

The aim of this study was to investigate the quality of communication between dentists and laboratory technicians regarding removable partial denture construction in Sudan, as there is no clear stipulation that outlines the dentist’s responsibility in authorizing the fabrication of any dental appliance. A study evaluating the quality of communication between dentists and dental laboratory technicians may give indication of improvements that are needed, and might contribute toward better-constructed removable prosthetic appliances in Sudan.

Materials and methods

This was a descriptive cross-sectional study of cases involving removable partial dentures constructed by registered private dental laboratories that have the facilities to fabricate cobalt chromium RPDs in Khartoum State. Private dental laboratories outside Khartoum State could not be included as no relevant records could be found with the Ministry of Health.

All cases or prescriptions sent to the selected dental laboratories for RPD construction were included in the study while any case or prescription for a prosthetic restoration other than RPD was excluded.

The sample size was determined through the following formula:

\[ n = \frac{z^2 pq}{d^2} \]

where \( n \) was the sample size, \( z \) the confidence interval 1.96, and \( p \) was 5.5% on the basis of results from a previous study (12), \( q \) was 1-p, and \( d \), the desired margin of error, was 5%. This led to a total sample size of 80. The required sample size of each type of RPD was then calculated, i.e., for cobalt chromium (CC) partial dentures and acrylic (A) partial dentures, according to the total average of cases per month:

\[ n = \text{average of cases (CC)/ month} \times \frac{\text{total sample size}}{\text{total average of cases (A & CC) / month}} \]

Cobalt Chromium RPDs = \[ \frac{26 \times 80}{190} = 11 \text{ cases} \]

Acrylic RPDs = \[ \frac{163 \times 80}{190} = 69 \text{ cases} \]
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Nineteen technicians participated in the study. They constructed 80 RPDs prescribed by dentists, of which 69 cases (86.25%) were A-RPDs and 11 cases (13.75%) were CC-RPDs. Technicians received instructions, either verbal or written, from dentists in 78.3% (54 cases) of the A-RPD cases and in all of the CC-RPD cases (11 cases). Verbal instructions were obtained in 55.1% (38 cases) and written instructions in 23.2% (16 cases) of A-RPD cases, while verbal instructions were obtained in 54.5% (6 cases) and written instructions in 45.5% (5 cases) of CC-RPD cases. It is important to note that most of the technicians, 84.2% (16 cases), believed that the design of prosthesis is the responsibility of
### Table 1. Izradite komponente za akrilatne i djelomične proteze od kobalt-kroma

| Komponente proteze • Design components | Akrilatna RPD • Acrylic RPD N (%) | Kobalt-krom RPD • Cobalt chromium RPD N (%) |
|----------------------------------------|-----------------------------------|---------------------------------------------|
| 1. Je li stomatolog označio zube na koje se stavljaju kvačice? • Has the dentist indicated the teeth to be clamped? | Ne • No 47(68.1) | Ne • No 2 (18.2) |
| 2. Je li stomatolog odredio boju umjetnih zuba? • Has the dentist indicated the shade of artificial teeth? | Ne • No 30(43.5) | Ne • No 0 (0.0) |
| 3. Je li stomatolog predložio oblik stražnjih zuba? • Has the dentist indicated the form of posterior teeth? | Ne • No 56(81.2) | Ne • No 9 (18.8) |
| 4. Je li stomatolog ucrtao tijek stražnjeg palatinalnog ventila (ako je potrebno)? • Has the dentist drawn/ carved the posterior palatal seal (if needed)? | Ne • No 24(34.8) | Ne • No 1 (9.1) |
| 5. Je li stomatolog odredio vrstu velike spojke? • Has the dentist determined the type of major connector? | Ne • No 4 (36.4) | Da • Yes 7 (63.6) |
| 6. Je li stomatolog odredio vrstu male spojke? • Has the dentist determined the type of minor connector? | Ne • No 8 (72.7) | Da • Yes 3 (27.3) |
| 7. Je li stomatolog odredio položaj upirača? • Has the dentist located the position of the rests? | Ne • No 2 (18.2) | Da • Yes 9 (81.8) |
| 8. Je li stomatolog odredio položaj indirektnog retencijskog elementa? • Has the dentist located the position of the indirect retainer? | Ne • No 4 (36.4) | Da • Yes 5 (45.5) |

### Table 2. Upute za izradu A-RPD-a nasuprot CC-RPD-u

| Vrijednosti • P-value | A-RPD N (%) | CC-RPD N (%) |
|-----------------------|-------------|--------------|
| Jesu li uz radni model bile priložene upute? • Were there instructions accompanying the master cast? | Ne • No 15 21.7% 0 0% | Da • Yes 54 78.3% 11 100% |
| Je li se od vas tražilo da oblikujete protezu? • Have you been asked to design the prosthesis? | Da • Yes 14 20.3% 0 0% | Ne • No 55 79.7% 11 100% |
| Hoćete li morati kontaktirati sa stomatologom radi objašnjenja o obliku prije izrade proteze? • Will you need to contact the dentist for clarification of the design prior to making the prosthesis? | Ne • No 38 55.1% 6 54.5% | Da • Yes 16 23.2% 5 45.5% |
| Je li navedena dob pacijenta? • Was the age of the patient mentioned? | Ne • No 44 63.8% 5 45.5% | Da • Yes 10 14.5% 6 54.5% |
| Je li naveden spol pacijenta? • Was the gender of the patient mentioned? | Ne • No 52 75.4% 6 54.5% | Da • Yes 17 24.6% 5 45.5% |
| Je li naveden datum povratka? • Was the return date mentioned? | Ne • No 56 81.2% 5 45.5% | Da • Yes 13 18.8% 6 54.5% |
| Je li priložen dijagram dizajna? • Was there a design diagram? | Ne • No 43 62.3% 3 27.3% | Da • Yes 26 37.7% 8 72.7% |
| Razina značajnosti (0.05) prilagođena je za 7 testova (0.05/7 = 0.007), pa se p-vrijednost manja od 0.007 smatra značajnom • The level of significance (0.05) was adjusted for the 7 tests (0.05/7 = 0.007), which has led to the p-value of less than 0.007 being considered as significant. |
ničara. U ovom istraživanju tehničari su zamoljeni da oblikuju protezu u 20,3 % (14) slučajeva za A-RPD-e, ali ni jednu za CC-RPD-e. Liječnici su raspravljali o nacrtu proteze s tehničarima u 24,6 % (17) slučajeva za A-RPD-e i 45,5 % (5) slučajeva za CC-RPD-e. Tehničari su morali kontaktirati s terapeutom radi objašnjenja dizajna u 14,5 % (10) slučajeva za A-RPD-e i 54,5 % (6) slučajeva za CC-RPD-e. U 69 slučajeva koji su uključivali akrilatne parcijalne proteze, stomatolozi nisu naznačili na koje su se zube trebale staviti kvacice u 47 slučajeva (68,1 %), zatim nisu naznačili boju zuba u 30 (43,5 %) slučajeva ili oblik stražnjih zuba u 56 (81,2 %) slučajeva i nisu označili tijek palatinalnog ventila u 24 (34,8 %) slučaja (tablica 1.).

Za 11 parcijalnih proteza od kobalt-kroma, liječnici nisu naznačili zube na koje se trebale pričvrstiti kvacice u dva (18,2 %) slučaja, no za svaku je odabrana boja zuba, ali oblik stražnjih zuba naveden je u samo 2 (18,2 %) slučaja, a tijek palatinalnog ventila nije označen u samo jednom slučaju. Nadalje, tipovi glavnih spojki određeni su u sedam (63,6 %) slučajeva, tipovi malih spojki u tri slučaja (27,3 %), položaj upirica u devet slučaja (81,8 %), a položaj indirektnih retencijskih elemenata u pet (45,5 %) slučaja (tablica 1.).

I za akrilatne i za proteze od kobalt-kroma tehničari su naveli da je dob pacijenata spomenuta u 18,8 % (13) slučaja za A-RPD-e i 54,5 % (6) slučaja za CC-RPD-e; spol pacijenata nije zaboravljena u 37,7 % (26) slučaja za A-RPD-e i 72,7 % (8) slučaja za CC-RPD-e; datum povratka u 64,7 % (44) slučaja za A-RPD-e i 81,8 % (9) slučaja za CC-RPD-e; dijagram dizajna u 10,1 % (7) slučaja za A-RPD-e i 45,5 % (5) slučaja za CC-RPD-e; stomatolozi su analizirali modele u samo 18,2 % (2) slučaja za CC-RPD-e (tablica 2.). Preparacija zuba obavljena je u svim slučajevima s CC-RPD-om. Upute koje su liječnici dali tehničarima za A-RPD smatrale su se jasne u 8,7 % (6) slučaja, objašnjenje je bilo potrebno u 20,3 % (14) slučaja, loša su se smatrale u 34,8 % (24) slučaja i nije bilo nikakvih uputa u 36,2 % slučaja (slika 1.). Slično tomu, upute koje je dobio tehničar o CC-RPD-u bile su jasne u 36,4 % (4) slučaja, zahtijevale su objašnjenje u 45,5 % (5) slučaja, a loše su bile u 18,2 % (2) slučaja za CC-RPD (slika 2.). Kada se uspoređuju rezultati za A-RPD i CC-RPD koristeći se Fisherovim testom, jedina značajna povezanost (p = 0,004) utvrđena je za tehničara koji je trebao kontaktirati s doktorom radi objašnjenja dizajna (tablica 2.).

![Slika 1. Kvaliteta uputa za A-RPD prema broju komponenti](Image 1)

**Figure 1** Quality of instructions for A-RPD according to the number of design components

![Slika 2. Kvaliteta uputa za CC-RPD prema broju komponenti](Image 2)

**Figure 2** Quality of instructions for CC-RPD according to the number of design components
Rasprava

Rezultati ovog istraživanja pokazali su da su se A-RPD-i češće izrađivali od CC-RPD-a. Ti rezultati u skladu su s onima Radha i suradnika (12). To razočarava, jer CC-RPD-i bolje čuvaju oralno zdravlje od A-RPD-a, a oni drugi mogu čak osjetiti tkiva usne šupljine (10, 18, 19). Razlozi zašto se ipak češće izrađuju A-RPD-i mogu biti skupča izrade CC-RPD-a i nedostatak edukacije ili kliničkog iskustva u njihovoj konstrukciji (13). Kad je riječ o broju elemenata, većina uputa o izradi A-RPD-a i CC-RPD-a u ovom istraživanju nije bila jasna. To se može uspostediti s opažanjima drugih autora (8, 12 – 14, 16, 17, 20 – 22), a može biti pokazatelj neodgo- varajuće komunikacije između terapeuta i zubnog tehničara kao posljedica liječnikova oslanjanja na tehničara pri oblikovanju proteze. S druge strane, to može biti i zbog nedovoljne predgradipske edukacije o davanju uputa laboratoriju i o izradi RPD-a. Manje od četvrtine slučajeva s A-RPD-om i manje od polovine onih s CC-RPD-om došlo je s pisanim uputama, više nego u istraživanju Netoa i suradnika (23).

Pisane upute važne su tehničarima jer bi mogli zaboraviti pojedinosti ako im se daju samo usmeno. Još jedna prednost pisanih uputa jest da se one mogu smatrati pravim doku- mentom (24). Verbalna komunikacija može biti korisna kada tehničari trebaju dodatne informacije ili objašnjenja. U ta- kvim okolnostima ne smije se zanemariti važnost osobnog ili telefonskog razgovora (25).

Većina tehničara vjeruje da je oblikovanje proteze odgo- vornost stomatologa, suprotno nalazima Haj-Alija i suradni- ka (15). Tehničari su se trebali obratiti liječniku samo u ne- koliko slučajeva za A-RPD-e, ali u gotovo polu slučajeva za CC-RPD-e. U ovom istraživanju doktori su razgovarali s tehni- čarima osobno samo u prilično četvrtini slučajeva za A- RPD-e i oko polovine slučajeva za CC-RPD-e, što je slično rezultatima Al-Alsheikh (14). To upućuje na to da je potreb- no mnogo više napora da bi se poboljšala komunikacija iz- među stomatologa i tehničara kako bi se popravila kvaliteta protetičke usluge.

Tehničari su zamoljeni da oblikuju protezu u oko pe- tine slučajeva s A-RPD-om, a ni u jednom slučaju s CC-RPD-om, što se može uspostediti s opažanjima Lyncha i suradnika (17), no razlikuje se od drugih istraživanja (8, 13, 23). Možda stomatolozi stavljaju veći naglasak na upu- te pri izradi CC-RPD-a, negoli A-RPD-a zbog velikih troš- kova CC-RPD-a ili zato što su CC-RPD tražili stomatolozi koji su bili vješti od onih koji su tražili A-RPD. Rezulta- ti ovog istraživanja pokazali su da većina dijelova za A-RPD i CC-RPD nije bila jasno propisana, što je opet slično dosa- dašnjim istraživanjima (13, 17, 24, 23). To znači da stoma- tolozi uglavnom ostavljaju tehničarima oblikovanje proteze, što je neprihvatljivo jer terapeut treba biti odgovoran za dizajn RPD-a s obzirom na to da obavlja pregled, postavlja dija- gnозu i planira terapiju.

Dob pacijenta bila je navedena u manje od petine sluča- jeva za A-RPD-e i u gotovo polovini slučajeva za CC-RPD- e, a pol pacijenata bio spomenut u gotovo trećini slučajeva za A-RPD-e i oko tri četvrtine slučajeva za CC-RPD-e. Ta- kav nalaz ne zadovoljava jer su dob i spol važni u odabiru zu-
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Ali i sur.

ba (27, 28). Datum povratka spomenut je u više od polovine slučajeva za A-RPD-e i u većini slučajeva za CC-RPD-e. To je u skladu s rezultatima Al-Alsheikha (14), ali je suprotno rezultatima Carneira (15). Datum povratka važan je za organizaciju i učinkovitost. Stomatolozi su dizajnirali dijagram samo za nekoliko slučajeva s A-RPD-om, te za približno polovinu njih s CC-RPD-om, što je opet bilo slično kao u nekoliko istraživanja (8, 12, 14, 22), ali različito od istraživanja Lyncha i suradnika (16). Dijagrami bi se trebali upotrebljava ti češće kako bi se poboljšala kvaliteta komunikacije između terapeuta i zubnog tehničara. Dijagram koji se stvara nakon detaljne procjene pacijenta, uz analizu i artikulaciju studijskih modela, može se koristiti kao prihvatljivo odobreće za oblikovanje RPD-a (25).

Doktori su analizu modela obavljali u manje od petine slučajeva za CC-RPD-e, što se ponovno može usporediti s dosadašnjim istraživanjima (8, 14, 22). Možda je to posljedica slabe preddiplomske edukacije ili neznanja o važnosti tog postupka. Zubi su preparirani u svim slučajevima s CC-RPD-om, što se može smatrati pozitivnim jer je preparacija zuba nužna za uspješno liječenje (26). Tehničari su se trebali obra titi doktoru za objašnjenje dizajna znatno češće za CC-RPD-e (p = 0,004), negoli za A-RPD-e. Kažemo je navedo Lynch [8], oblikovanje bilo koje proteze temelji se na mehaničkim i biološkim načelima. Stoga su komunikacija između terapeuta i tehničara i/ili potpune informacije dobivene otiskom vrlo važne, jer ako se glavni otisak šalje u dentalni laboratorij s neadekvatnim informacijama o dizajnu, tehničar nema pristup ključnim informacijama vezanim za prirodu i zdravlje (biologija) parodontnih i drugih tkiva. To će negativno utje cati na sljedeće poteze i može rezultirati oštećenjem i ozljedama zubnog i parodontnog tkiva.

Bilo je nekih ograničenja u istraživanju koje treba uzeti u obzir pri tumačenju rezultata. Prvo – istraživanje je obavljeno u obliku ankete koja se oslanjala na sjećanje tehničara o pojedinostima vezanima za upute o svakom slučaju, a anketa je provedena nakon probe proteze. Drugo – točnost procjene ovisila je o nepristranosti tehničara i treće – odabir dentalnih laboratorija u ovom istraživanju ovisio je o tome jesu i opremljeni uzrastom. Zato možda odabra ni dentalni laboratoriji nisu reprezentativni predstavnicii svih dentalnih laboratorija u pokrajini Khartoumu.

design the prosthesis, which is unacceptable as the dentists should be fully responsible for the RPD design, since they perform the examination, diagnosis, and treatment planning.

The age of the patient was stated in less than a fifth of A-RPD cases and in nearly half of CC-RPD cases, while patients’ gender was mentioned in almost a third of A-RPD cases and in about three quarters of CC-RPD cases. This revelation is unfortunate, as age and gender are important guides in tooth selection (27, 28). The return date was mentioned in more than half of A-RPD cases and in most of CC-RPD cases. This is consistent with the results obtained by Al-Alsheikh [14were part of the questionnaire. Out of two hundred distributed questionnaires, 136 were received (response rate=68%), but conflicts with the results of Carneiro (15). The return date is important to organizational effectiveness of the subsequent appointment for the patient.

The dentists designed a diagram for only a few cases of A-RPD, and for around half of the CC-RPD cases, which is again similar to several studies (8,12,14,22), but different from those by Lynch et al (16). Diagrams should be used more often in order to improve the quality of communication between dentists and dental technicians. A design diagram that is formed after a careful evaluation of the patient, with subsequent surveying and articulation of study casts, can be used as an acceptable work authorization for an RPD design (25).

Surveying of the casts by dentists was implemented in less than a fifth of the CC-RPD cases, which again was comparable to previous studies (8,14,22). It is possible that this is a consequence of poor undergraduate training, unavailability of surveyors, or ignorance of the dentists regarding the importance of surveying. Tooth preparations were performed in all of the CC-RPD cases, which may be considered positive as tooth preparations are essential for obtaining a successful treatment outcome (26). Technicians needed to contact the dentist for clarification of design significantly more for CC-RPD (p=0,004), than A–RPD cases. As previously stated by Lynch (8), the design of any prosthesis is based on mechanical and biological principles. Hence, communication between the dentist and dental technician and/or complete information provided with the impression is a very important step because if master impressions are being sent to dental laboratories with inadequate design information, the technician does not have access to crucial information relating to the nature and health (biology) of the periodontal and other tissues. This will reflect negatively on the following steps and may result in damage and injuries to dental and periodontal tissues.

There were some study limitations that should be considered when interpreting the results of this research work. First, the study was based on an interview format that relied on the memory of the technicians for details of the instructions sent with each case, particularly given that the interview was made after the try-in stage of the prosthesis. Likewise, the accuracy of the assessment also depended on the impartiality of the technician. Thirdly, the selection of the dental laboratories in this study was dependent on the existence of facilities for fabrication of CC-RPD. Therefore, the selected dental laboratories might not be representative of all dental laboratories in Khartoum State.
Zaklučak
Kvaliteta komunikacije između doktora oralne medicinе i zubnih tehničara o izradi mobilnih parcijalnih proteza nije bila odgovarajuća. Potrebno su jasne smjernice koje ističu odgovornost doktora oralne medicinе u odobravanju izrade mobilnih proteza kako bi se poboljšala trenutačna situacija.

Sukob interesa
Autor ne navodi sukob interesa.

Abstract

**Objectives:** To investigate the quality of communication between dentists and dental laboratory technicians in private dental laboratories in Khartoum State related to fabrication of removable partial dentures. **Methods:** This was a descriptive cross-sectional study, in which dental technicians were interviewed regarding the quality of instructions they received from dentists concerning the construction of removable partial dentures (RPD). Eighty cases were investigated, 69 acrylic (A-RPD) and 11 cobalt chromium (CC-RPD) dentures. **Results:** Although dentists provided no instructions in 21.7% of A-RPD cases, they gave instructions in all CC-RPD cases. Instructions were primarily given verbally (55.1% in A-RPD, 54.5% in CC-RPD cases), as opposed to written (23.3% in A-RPD, 45.5% in CC-RPD cases). Most design components for A-RPD and CC-RPD cases were not clearly prescribed, and instructions were clear in only 8.7% of A-RPD and 36.4% of CC-RPD cases. Notably, surveying of casts by dentists was only done in 18.2% of CC-RPD cases. Most technicians (84.2%) believed that prosthetics design was the dentists’ responsibility. Technicians needed to contact dentists for clarification of design significantly more frequently for CC-RPD (p=0.004) cases. **Conclusion:** Quality of communication between dentists and private laboratory technicians in Khartoum State with regard to removable partial denture construction was largely inadequate.

Conflict of interest

None declared

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