

www.jmscr.igmpublication.org

Impact Factor 5.84

Index Copernicus Value: 83.27

ISSN (e)-2347-176x ISSN (p) 2455-0450

crossref DOI: <https://dx.doi.org/10.18535/jmscr/v5i8.139>

Journal Of Medical Science And Clinical Research

An Official Publication Of IGM Publication

Scheduling multiple surgical procedures in immunocompromised rheumatoid patient on immunosuppressant regimen

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Abstract

Rheumatoid arthritis is a disease that can be crippling as well as fatal. The use of disease modifying drugs (methotrexate) and biologic response modifiers (adalimumab) have helped in altering the history, course and fatality related to the disease. In advance stages, surgical intervention in the joints becomes a necessity and healing has been successfully accomplished by withholding the drugs for a period of 1 to 2 weeks depending upon the dose of the drugs. However, dental surgical procedures like multiple pulpectomy, multiple extractions and crown lengthening procedures have to be completed in several appointments that demand a different approach in such patients. This article presents a case report of a 23 year old female, with a history of rheumatoid arthritis under a prescribed medication regimen, who presented generalized gross rampant caries of the natural teeth that required full mouth rehabilitation.

Keywords: immunity, dental laser, crown lengthening, full mouth rehabilitation, endodontic.

1. Introduction

Rheumatoid disorders occur in a wide range with extremely high variability. Some of the disorders develop very rapidly while many others progress chronically. Among various rheumatic originating disorders, the problem of inflammatory arthritis leads to significant pain, disability and deformity as the disease can progress as a multisystem immune disorder.¹ Drug regimen used in managing rheumatoid arthritis is divided into three main categories: NSAIDs, glucocorticoids and disease modifying anti-rheumatic drugs (DMARDs). DMARDs include agents such as methotrexate, hydroxychloroquine, sulfasalazine, azathioprine,

and leflunomide, as well as biologic response modifiers that inhibit tumor necrosis factor and interleukin-I (etanercept, infliximab, adalimumab, anakinra, and rituximab).²⁻⁵ Most of the regimens involve a combination of both DMARDs and glucocorticoids, which cause significant immunosuppression thereby delaying wound healing and predisposing patients to infection.³

The use of methotrexate in modifying the disease has been successful and it has become the choice of drug in eighty percent of the cases, although methotrexate is also a dose dependent anti-cancer drug.⁶ Surgical interventions in these cases need a thorough investigation and planning, because of the fact that immune suppression is a part of these drug

regimens. Orthopedic studies have demonstrated the time period during which medications should be withheld.⁷ However, dental surgeries (both major and minor) are different from orthopedic surgeries in terms of extent, duration, intensity, type of post operative care and use of associated drugs like anesthesia, antibiotics and analgesics. Clinical procedures like pulpectomy, crown lengthening and extraction of teeth involve multiple surgeries at different intervals of time and range from being both minor or major surgical interventions. Major full mouth rehabilitations invariably require surgical interventions as part of pre prosthetic mouth preparation. This case report describes scheduling of multiple dental surgeries (extraction, root canal treatment and crown lengthening) in a patient suffering from active rheumatoid arthritis, during her full mouth rehabilitation.

Case Report

An unmarried female patient in late twenties reported to the comprehensive care clinic at college of dentistry, with a chief complaint of poor aesthetics of natural dentition since last three years. The patient also reported a history of rheumatoid arthritis (systemic) diagnosed about 1 year back for which patient was under a regimen of medication [methotrexate (2.5mg), Celebrex (100mg), Humira (adalimumab), folic acid (Befolvit), calcium and vitamin D (Centrum)] since last 6 months. Reported history included fatigue, dryness of skin, especially of the facial region, intermittent pain in the temporomandibular joint on the left side that exaggerates when she opens the mouth wide and very recently excessive hair loss. Facial dryness was at localized areas and the mandibular lip was relatively large in relation to maxillary lip and lower third of the face. Extra oral examination revealed absence of tenderness, pain, discomfort in either temporomandibular joint or masticatory muscles. The lymph nodes were enlarged without being tender. Intra oral examination revealed chronic generalized gingivitis with localized periodontitis, generalized grossly decayed teeth (resembling rampant caries) with absence of occlusion or

maintenance of any vertical stop on any of the posterior teeth (Fig1a-c). Radiographs revealed multiple periapical lesions, root stumps, localized periodontitis and pulpal involvement of most of the natural teeth (Table 1) (Fig 1d).



Figure 1: A) Maxillary dentition B) Mandibular dentition C) OPG showing the periodontal and pulpal status of permanent dentition.

Diagnosis and treatment plan was focused towards achieving full mouth rehabilitation and after making preliminary impressions with irreversible hydrocolloid (Jeltrate Alginate, Fast Set; Dentsply Intl, York, Pa) , diagnostic casts were mounted on a semi adjustable articulator (Whip Mix; Elite Dental Services, Inc, Orlando, Fla) that was programmed using interocclusal records (Fig 2a). After thorough clinical, radiographic, mounted cast evaluation and removal of caries, the patient was presented with a basic treatment plan that involved pre prosthetic mouth preparation (removal of caries, oral hygiene maintenance program, multiple restorations) and a final prosthetic plan that included single crowns, fixed partial dentures and a cast partial denture. Surgical indications included extraction of ten grossly decayed teeth with subgingival caries involvement (maxillary three molars and mandibular seven teeth (two central incisors and 5 posterior teeth), endodontic treatment of 15 permanent teeth (11 maxillary and 4 mandibular), crown lengthening of all remaining natural teeth followed by post core restorations (12 teeth) (3

prefabricated and 8 cast post core) and a temporary partial denture.

Course and extent of surgical procedures were based on clinical judgement, radiographic interpretation and bone indexing around each tooth by an experienced multi-disciplinary team that

Table 1: Planning of multiple oral surgical procedures

Extraction	16,18	28	31,36,37,38	41,46,48
Crown lengthening	Anterior (Maxilla)	Anterior (Mandible)	Posterior (Left)	Posterior (Left)
Pulp extirpation	13,14,15,16,17	23,24,25,27	46	
Planned time (no of days) required for all surgical procedures (10 days in three stages)	<p>1st stage (Day 1) : Anterior pulp extirpation followed by crown lengthening (manual maxillary and mandibular anteriors only) and extraction of 31 and 41</p> <p>2nd stage (Day 4): pulp extirpation of indicated teeth on the right side of both arches, followed by crown lengthening (laser) and extraction of indicated teeth on the same side.</p> <p>3rd stage (Day 10): pulp extirpation of indicated teeth on the left side of both arches, followed by crown lengthening (laser) and extraction of indicated teeth on the same side.</p>			

included prosthodontist, endodontist, oral surgeon, periodontist, physician and a rheumatologist. After presenting the treatment plan to the patient, a list of all dental materials and chemicals was prepared and presented to the patient’s physician who after thorough discussion approved the same. After, thorough investigations that included complete blood count, electrolytes and BUN (blood urea nitrogen), electrocardiogram, X- rays, including chest and cervical spine, pulmonary function test, blood gases and liver function tests, an informed consent of the patient was obtained.

Surgical phase was initiated based on the following principles. The entire surgical phase would be completed within a period of ten days in three or four stages and the patient will be on prophylactic antibiotic coverage. From the existing drug regimen, only Methotrexate (1 week) and adalimumab (2 weeks) were stopped both before, during and after surgery. Folic acid and vitamins were continued besides prescribing some natural immune enhancers like honey and milk. Nutritional supplements were increased and multi vitamins were prescribed to the patient. Appointments were given on early morning and the patient was advised to come after consuming heavy breakfast. During the entire

surgical phase, the patient was under antibiotic coverage (amoxicillin 2 g in divided dose for ten days) and prophylactic antibiotic coverage (2 g orally 1 hour before major surgical procedure).

During the first surgical stage, the pulp of anterior teeth was extirpated and temporary restorations were done after biomechanical preparation of all involved teeth followed by disinfection of the root canal. At the same appointment, maxillary and mandibular anterior teeth crown lengthening was done by performing manual gingivectomy under local anesthesia (Fig 2 b and c). Extraction of root stumps was done on the same day (Fig 2d). In the next stage, pulp extirpation was done for all indicated teeth on the right side of both maxillary and mandibular arches. This was followed by laser gingivectomy on the same side (Fig 2 e-h). Periodontal dressing was placed after all crown lengthening procedures. In the next stage on the tenth day of the surgical phase, pulp extirpation, crown lengthening and root stump extraction of the left side of both maxillary and mandibular arches were done. The patient was given instructions related to post surgical care for each procedure. From the last day of dental surgical procedure, the regular medication regimen was started after two weeks. During these two weeks, endodontic treatment (excluding pulp extirpation) of indicated teeth was done using a quadrant arch approach (Fig 3a). To summarize major pre prosthodontic mouth preparation was completed within a period of three weeks. The patient was then put on observation for a period of another four weeks so that clinical evidence of successful endodontic treatment is observed. The patient was put on a strict semi liquid diet and oral hygiene maintenance during this period to minimize gingival growth.



Figure 2: Crown lengthening procedures at various stages

The Prosthodontic phase started with a complete evaluation of surgical and endodontic treatment. This was followed by post and core build ups that included prefabricated fiber post (Rely X fiber post 3M – ESPE) and custom cast dowel core to teeth whose crown destruction was more than seventy five percent (Fig 3b, c). The quadrant arch approach was used to build post core following which CAD/CAM temporary crowns (CEREC-AC Sirona) were cemented (Fig 4 a,b). Full mouth rehabilitation of the permanent dentition progressed utilizing Pankey mann schulyer’s principles of occlusal rehabilitation through a quadrant arch technique (Fig 4 c-e). Following insertion of a cast partial denture fabricated over single surveyed crowns, the patient received instructions regarding home care maintenance and follow up visits. The patient was extremely satisfied with the results ((Fig 4 f-h) and even demanded diamond bonding to his new appearance (Fig 4 i).



Figure 3: Orthopantomograph after endodontic treatment (a) and post core build up (b)

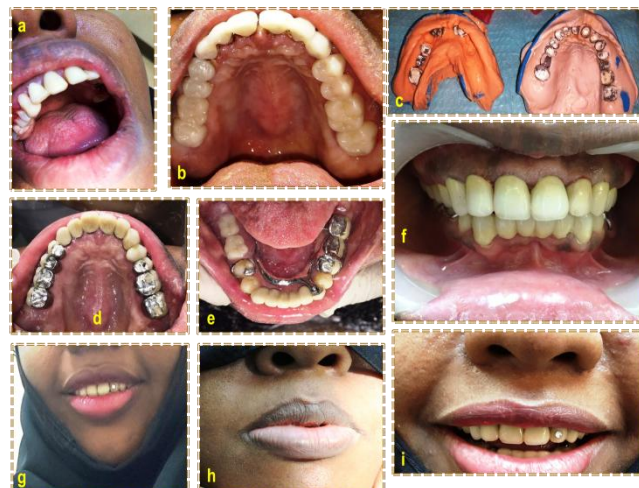


Figure 4: (a,b) CAD/CAM temporary crowns, (c) pick up impressions (d,e) completed full mouth rehabilitation including surveyed crowns and cast partial denture (f-h) extra oral view at post follow up (diamond bonding in maxillary left incisor was done at patients request)

Discussion

Rheumatoid arthritis is one among the many different forms of rheumatic disease. It is not solely a disease of the joints, but a systemic disease characterized pathologically by widespread changes in various tissues and organs. Pathologically it is an inflammatory reaction of the comparatively undifferentiated connective tissues. The use of DMARDs like methotrexate (most commonly used in up to 80%), results in altering the natural history and course of the disease thereby increasing life expectancy, however, resulting in significant immunosuppression. The drug is a folic acid analog, and acts by inhibition of purine and pyrimidine synthesis, suppression of transmethylation reactions with accumulation of polyamines, reduction of antigen – dependent T-cell proliferation and promotion of adenosine release with adenosine-mediated suppression of inflammation. It is thought that the anti-inflammatory mechanism of methotrexate is due to a combination of these multiple mechanisms.⁸

Studies have demonstrated that both DMARDs and biologic response modifiers should be stopped for 1 to 2 weeks before surgery and resume 2 weeks post operatively.⁹⁻¹¹ Withholding drugs may result in

flaring of disease process, post-operative infections, wound dehiscence and impaired healing.¹² In this case, methotrexate was stopped 1 week prior to the first surgery and adalimumab was stopped 2 weeks prior. This allowed the physician to rule out the possible flare up that would have complicated dental surgical procedures, especially if the temporomandibular joint would have been involved. Pre anesthetic assessment is must to determine the disease extension so that anesthetic and surgical risks are minimized. Consequences of articular and systemic disease and the adverse effect of drug therapy interfering with anesthesia is highly significant.^{13,14}

Conclusion

Although rheumatoid arthritis is a disease that can be physically crippling, oral rehabilitation should be attempted under due precautions and properly planned schedule to enhance normal healing. Psychological boost that augments confidence in such patients cannot be estimated by ordinary means.

Acknowledgements

The authors would like to acknowledge the efforts made by the patient and her friends and relatives for having confidence in the faculty of the college. Also, due acknowledgements to all members of the multidisciplinary team, supporting staff that included dental assistants and dental technicians.

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