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From Irritation to Proliferation: Management of Focal Intraoral Fibrous Hyperplasia of the Buccal Mucosa with Diode Laser – Case Series

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Abstract

Fibroma is a reactive lesion of fibroblastic origin and is acknowledged as the most prevalent soft tissue lesion found in the oral cavity. It frequently happens because of long-term discomfort or recurrent minor injuries, including sharp teeth rubbing against each other, dental work, or biting one's cheek all the time. These constant stimulations cause too much fibrous connective tissue to grow, which leads to the production of a localised growth. In a clinical setting, these lesions appear as benign neoplasms that often exhibit moderate growth, well-defined borders and a lack of symptoms. Most of the time, patients don't know about the lesion until it gets bigger or makes it hard to eat or speak. Fibromas can be either pedunculated or sessile growths, and they usually have a smooth surface and a colour that is comparable to the mucosa around them. Even if they are not malignant, surgery is often needed to confirm the diagnosis, improve function or improve appearance. There are many ways to treat fibromas, including as traditional surgical excision with a knife, electrocautery, and laser-assisted excision procedures. This case series examines the minimally invasive treatment of fibroepithelial polyps of the buccal mucosa utilising a diode laser, highlighting its efficacy, accuracy, and patient-centered methodology in clinical practice.

Keywords: Buccal mucosa, Fibroma, LASER, Excision, Oral lesion.

Introduction

In 1846, fibrous polyps were first described as a type of soft tissue reaction that happens when teeth, dental restorations, or dental prostheses keep bothering the same area (1). At first, these lesions were thought to be localised overgrowths of connective tissue that formed in response to repeated mechanical trauma in the mouth. Since they were first described, fibrous polyps have been called by a number of different names in the scientific literature. This is because they can look different in clinical settings, have different causes, and be interpreted differently in histopathology. Some other names for these are fibroepithelial polyp, irritated fibroma, traumatic fibroma, peripheral fibroma, focal fibrous hyperplasia, inflammatory fibrous hyperplasia, and, more generally, fibrous lump (2). Even though the terms are different, they all refer to the same type of reactive lesion that forms fibrous tissue in response to long-term irritation. Fibroepithelial polyps do not affect one gender more than the other; they affect both men and women equally. Epidemiological studies show that they make up about 4.5% of all oral mucosal pathologies, which means they are one of the most common benign lesions that dentists see on a regular basis (3). In the early stages, these lesions usually look like painless, slowly growing lumps that don't get in the way of daily activities like talking or chewing. They often affect the tongue, buccal mucosa, and lips, and they are often linked to chronic irritation caused by habits like biting your cheeks, wearing orthodontic appliances, having sharp tooth edges, or wearing dentures that don't fit properly. Patients may not know about the lesion until it is found during a routine dental exam or becomes big enough to hurt. Most of the time, these lesions are found on the occlusal plane of the maxillary and mandibular teeth, where they are most likely to be damaged mechanically over and over again (4).

Cooke put all pedunculated mucosal swellings into

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the group of fibro-epithelial polyps, which highlighted their unique way of attaching and their shape (5). In terms of histology, these lesions can look like either pedunculated or sessile growths. They are made up of hyperplastic fibrous connective tissue that is covered by stratified squamous epithelium. The connective tissue stroma often has different amounts of collagen fibres, which shows that the irritation has been going on for a long time. Fibroepithelial polyps look like smooth, well-defined growths that are firm to the touch in a clinical setting. They are usually less than 1.5 cm across and have a colour that is very similar to the colour of the surrounding oral mucosa (6). However, the colour may change slightly depending on how inflamed or vascular the area is.

There is a lot of interest in diode laser excision for treating fibroepithelial polyps because it has many benefits over traditional scalpel-based surgery. Diode lasers give doctors more accuracy, which lets them remove lesions without hurting nearby healthy tissues as much. This level of accuracy makes it easier to control bleeding and see better during surgery, which makes it easier to remove lesions more quickly. Also, the laser's ability to seal blood vessels during an incision greatly lowers bleeding during surgery, making the surgical field cleaner and lessening the need for sutures. These traits help the body heal faster, hurt less after surgery, and swell less. Diode laser excision is a better option than traditional scalpel procedures because it has a lower risk of recurrence, a faster recovery time, and better patient comfort. Traditional surgery often takes longer to heal, has a higher risk of recurrence, and leaves more scars, which can make both function and appearance worse.

A correct clinical diagnosis is very important for managing fibroepithelial polyps well. A full clinical exam, along with the right diagnostic tests, is necessary to figure out what kind of lesion it is and what the best way to treat it is. There are many different ways to treat this condition, such as traditional excision, electrocautery, and laser therapy. Diode laser excision has become one of the best and least invasive ways to treat these conditions (5). Diode laser therapy has many benefits, such as cutting tissue precisely, stopping bleeding effectively, making the surgical field easier to see, reducing scarring, improving infection control, speeding up wound healing, reducing pain and swelling after surgery, and making patients happier and more willing to accept the treatment (7).

The main conditions that can be mistaken for fibroepithelial polyps are mucocele, pyogenic granuloma, peripheral ossifying fibroma, papilloma, and lipoma. Mucoceles are cystic lesions that are filled with fluid and are usually soft and changeable. Pyogenic granulomas, on the other hand, are highly vascular lesions that tend to bleed easily. Peripheral ossifying fibromas have parts of tissue that have hardened and may act more aggressively in the area around them. Papillomas, which are often linked to human papillomavirus infection, have a rough, cauliflower-like surface. Lipomas, on the other hand, are soft, mobile lumps made of fat tissue. Histological examination is still necessary for an accurate diagnosis because it allows fibroepithelial polyps to be distinguished from other lesions based on their tissue composition and structural features. This makes sure that the right treatment plan and management are in place (8).

Aim of the Study

The main goal of this study is to look at how well diode laser excision works in treating fibroepithelial polyps in the mouth, as well as how safe it is and what effects it has on patients. The study wants to find out if diode laser therapy is better than standard treatments at providing better surgical precision, less bleeding during surgery, faster healing, and more comfort for patients.

Previous Studies and their Limitations

A number of studies have looked into how lasers can be used to treat soft tissue lesions in the mouth. In a particular study, the clinical outcomes of diode laser excision in benign oral lesions were looked at and it was found that there were less bleeding and faster healing than with scalpel surgery (9). But their study looked at a wide range of lesions and did not focus on fibroepithelial polyps in particular. Also, the sample size was small, and there was not enough long-term follow-up data to figure out how often the disease came back. In the same way, another study looked at how diode lasers could be used in oral soft tissue surgery and found that they made patients more comfortable and caused very few problems after surgery (10). Even though these results were good, the study did

not have a lot of detailed histopathological correlation and did not give standard criteria for judging healing and pain.

Research Gap

There is a gap in the research because there aren't many studies that only look at fibroepithelial polyps, even though many studies have shown that diode laser therapy works well for managing oral soft tissue. There is also not enough detailed case-based evidence linking clinical outcomes, histopathological findings, and patient-reported experiences after diode laser excision. This shows that there is a need for focused clinical studies that look at diode laser treatment for fibroepithelial polyps using standard measures.

Novelty of the Study

The new thing about this study is that it looks closely at diode laser excision for fibroepithelial polyps using a detailed case series approach. This study is different from others because it only looks at one type of lesion and compares clinical findings with histopathological confirmation and postoperative outcomes. The study also stresses patient-centred outcomes like comfort, healing time, and satisfaction, as well as clinical effectiveness. This study gives practical clinical evidence that diode laser therapy is a safe, effective, and patient-friendly way to treat fibroepithelial polyps by showing well-documented cases with regular follow-up.

Case Report

Case I

A 39-year-old female patient reported to the Department of Periodontology in Mahatma Gandhi dental college and hospital, Jaipur with the chief complaint of painless overgrowth in the left cheek region since last 4 months. On intraoral examination lower left cheek region, a well-defined pale pink, solitary non – tender, pedunculated exophytic soft tissue mass was observed, as depicted in Figure 1. It occupies nearly one-thirds of the inner surface at the corner of the mouth. Size of the lesion, as shown in Figure 2, was approximately 6.5 x 6.5 mm.

Area surrounding the lesion was infiltrated using 2% lidocaine and 1:100,000 adrenaline (locally). The lesion was stabilized with suture thread (Figure 3). An excisional biopsy was carried out in the left buccal mucosa region using a diode laser (610–840 nm; 1.5 W) (Figures 4, 5) After removal of the lesion, the surgical site was cleaned with sterile gauze moistened in 1% normal saline solution. The excised tissue was sent for the histopathological examination which relevels the feature of fibroma. (Figure 6).

The procedure, was well tolerated without pain or discomfort. The patient was discharged with antibiotic, analgesics, and at One-month follow-up, the site had healed completely without scarring (Figure 7).

Figure 1: Fibroma at Left Buccal Mucosa

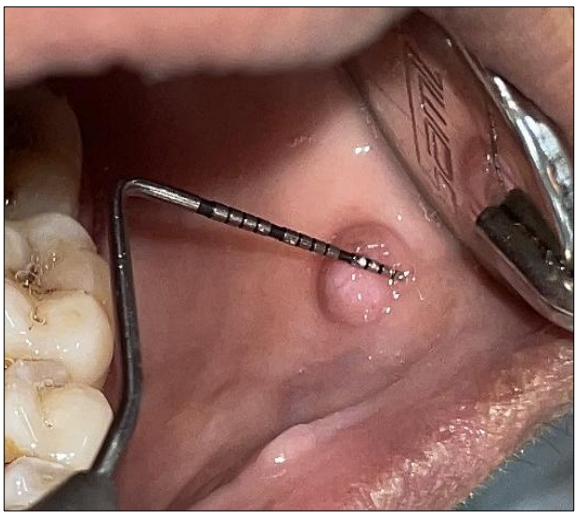

Figure 2: Initial Size of Fibroma

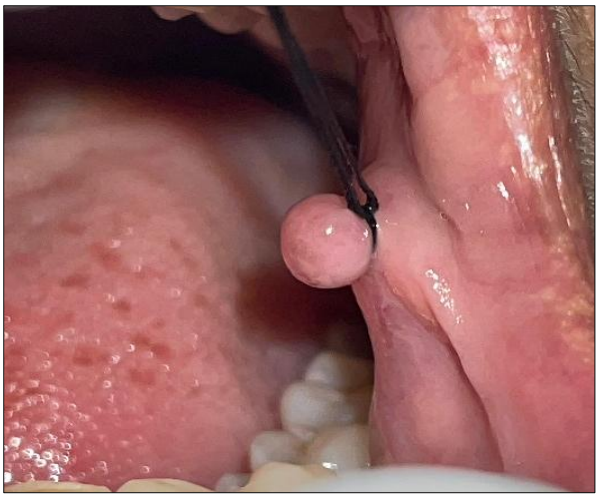

Figure 3: Held at its Base Using Thread

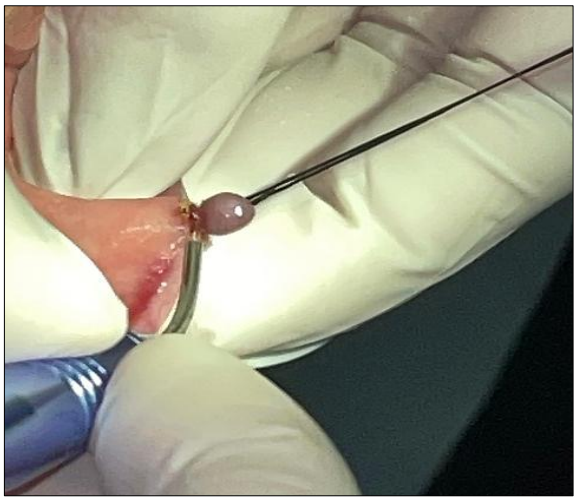

Figure 4: LASER Excision

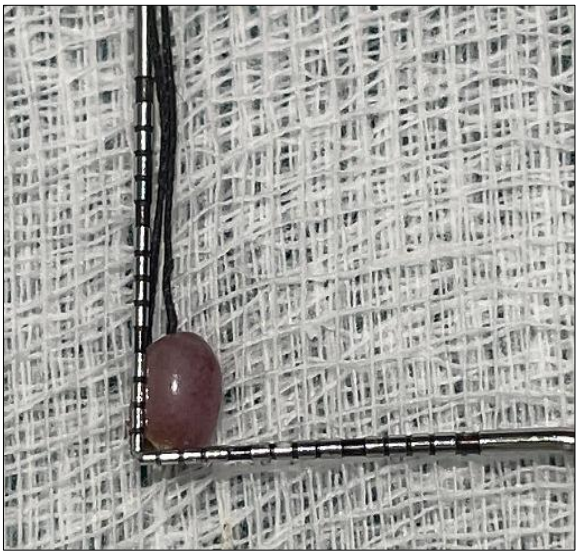

Figure 5: Size of Lesion

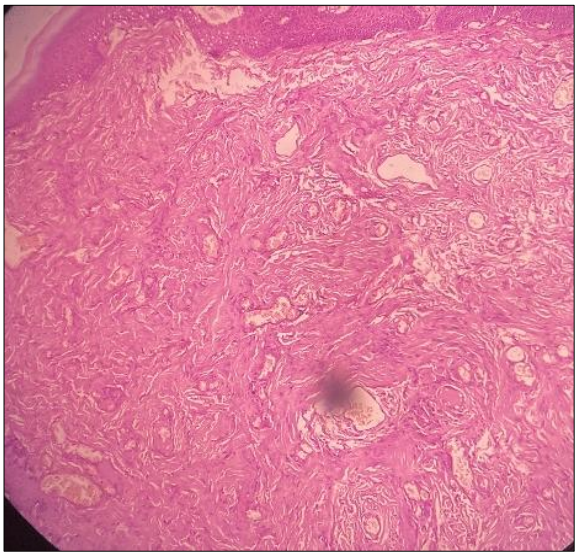

Figure 6: Histopathological Findings

Figure 7: Healing After One Month

Case II

A 42-year-old female patient with the chief complaint of painless overgrowth in the left cheek region since last 1 year. At the 3-month follow-up, the patient reported a history of growths that were initially small and gradually increased to their present size. On intraoral examination lower left cheek region, a large pale pink, sessile, non – tender growth was present near posterior maxillary and mandibular teeth which had interfered with normal chewing and oral function, and the patient reported discomfort during mastication (Figure 8). Size of the lesion was approximately 14x 14 mm (Figure 9).

The treatment was carried out in the same manner as Case 1. At the six-month follow-up, there were no signs of recurrence (Figure 10).

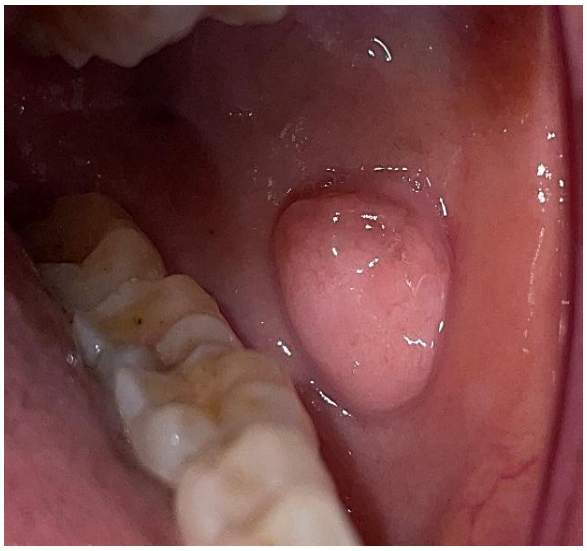

Figure 8: Fibroma at Left Buccal Mucosa

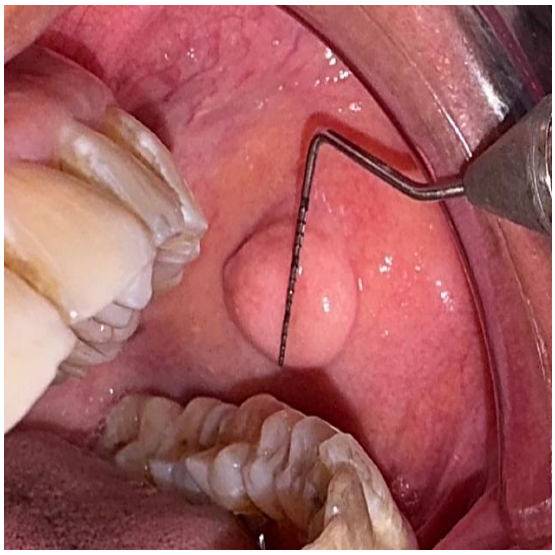

Figure 9: Initial Size of Fibroma

Figure 10: Healing After Six Months

After the diode laser excision of the fibroepithelial polyps, patients were prescribed a standard postoperative regimen to ensure proper healing and prevent infection. Antibiotics, specifically Amoxicillin 500 mg, were administered orally three times a day for 5 days to prevent postoperative infections, particularly in the oral cavity where the risk of bacterial contamination is high. For pain management, Ibuprofen 400 mg was given orally every 6 hours for 3 days to reduce pain and inflammation. The use of antibiotics was justified due to the invasive nature of the procedure and the high risk of infection in the oral environment, while the analgesics were prescribed

to enhance patient comfort during the recovery period.

Discussion

Several pathological processes in the oral cavity can result in tissue enlargements, making diagnosis challenging. These enlargements can arise from a variety of causes, including inflammatory responses, infections, or neoplastic growths. Chronic tissue trauma or irritation, such as that caused by poorly fitting dentures, braces, or habitual cheek biting, often triggers an exaggerated tissue response, leading to the formation of benign soft tissue lesions like fibromas (11). This irritation induces the proliferation of fibroblasts, which leads to the accumulation of collagen fibers and the formation of a fibrous tissue growth. In some cases, these lesions may become pedunculated (attached to the underlying tissue by a stalk), while in other instances, they remain sessile (broad-based) (12, 13, 6).

Fibroma, also known as fibroepithelial polyp, is a common benign soft tissue lesion of the oral cavity. It most frequently arises in response to chronic irritation from factors such as cheek biting, ill-fitting dental appliances, or orthodontic devices (14). The lesion typically presents as a painless, well-circumscribed nodule, which can vary in size and shape but is generally less than 1.5 cm in diameter. These lesions are most commonly found on the buccal mucosa, tongue, or lips, often matching the color of the surrounding mucosa (15). This resemblance to normal oral mucosa sometimes makes the lesion less noticeable, which may delay diagnosis and treatment (16).

The prevalence of traumatic fibromas has been found to be higher in females, particularly those in the fourth decade of life, which could be attributed to hormonal factors, increased orthodontic appliance use, or higher rates of habitual cheek biting in women (10). Additionally, fibromas tend to develop at sites that are subjected to continuous mechanical irritation, and they are often seen along the occlusal plane of the maxillary and mandibular teeth. While fibromas are generally benign, they can interfere with oral function, cause discomfort during mastication, or lead to aesthetic concerns, prompting many patients to seek treatment (17).

In both of the cases described, the lesions were successfully excised using a diode laser, a minimally invasive treatment modality. The diode laser is well-known for its precision in tissue removal, which allows for targeted excision with minimal damage to the surrounding healthy tissue (18). The laser's ability to simultaneously coagulate blood vessels during the excision process results in excellent hemostasis, which minimizes intraoperative bleeding. This is particularly advantageous in oral surgery, where a clean surgical field is critical for optimal visibility and successful outcomes (19).

Furthermore, diode laser excision offers several additional benefits, including reduced operative trauma, improved patient comfort, and enhanced post-operative recovery. The laser's ability to sterilize the tissue as it cuts can reduce the risk of infection and promote faster wound healing (20, 21). As the laser does not require sutures in most cases, post-operative care is simpler, and patients typically experience less discomfort, reduced swelling, and quicker recovery times compared to conventional surgical excision (5, 22-24).

Overall, these cases underscore the diode laser as a valuable tool for the management of fibroepithelial polyps of the oral mucosa. The advantages of this technique make it an appealing option in the treatment of benign fibrous lesions caused by chronic irritation, such as those resulting from cheek biting or ill-fitting dental appliances. Its use in routine dental practice has the potential to improve patient outcomes, promote faster healing, and reduce surgical complications, advocating for its broader adoption. As more dental practitioners become familiar with laser technology and its benefits, diode laser excision may become the standard treatment for managing these common oral lesions, offering both functional and aesthetic improvements for patients (25).

Conclusion

Diode laser excision is a safe, effective, and minimally invasive way to treat fibroepithelial polyps and traumatic fibromas in the mouth. This method allows for accurate removal of lesions, good haemostasis, little bleeding, and less pain after surgery. Its sterilising effect and better visibility during surgery also help the body heal faster with less scarring. As a result, patients have

better surgical outcomes, shorter surgery times, better cosmetic results, and higher levels of satisfaction after surgery. Diode laser therapy is especially helpful for people who are sick or anxious because it reduces the need for stitches and painkillers, which speeds up recovery and improves quality of life.

Even though these are good things, there are some drawbacks that need to be recognised. The high initial cost of laser equipment and upkeep is still a big problem, especially in clinical settings where resources are limited. Additionally, using diode lasers successfully requires special training and clinical experience to avoid damaging nearby tissues too much with heat. Choosing the wrong parameters or not using the right tools can slow down healing, burn tissue, or leave some lesions behind. Also, the fact that you can't feel anything during laser surgery could make it harder to accurately measure the edges of a lesion, which could make it harder to completely remove it in some cases. There is still not much long-term comparative data between laser-assisted and traditional surgical methods.

Future research should prioritise the execution of large-scale, randomised controlled trials to develop standardised clinical protocols and refine laser parameters for various lesion types and anatomical sites. It is necessary to conduct comparative studies that assess long-term recurrence rates, histopathological outcomes, and cost-effectiveness between diode laser and traditional scalpel excision. Moreover, examinations of patient-reported outcomes, encompassing pain perception, functional recovery, and psychological well-being, would yield significant insights into the comprehensive advantages of laser therapy. Improvements in laser technology and the use of digital surgical planning may make things even safer and more accurate. To build the evidence base and encourage the safe and widespread use of diode lasers in oral soft tissue management, interdisciplinary research and clinical training programs must continue.

Abbreviations

DL: Diode Laser, FEP: Fibroepithelial Polyp, PF: Peripheral Fibroma, EB: Excision Biopsy.

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Author Contributions

Priyanka Pawar: contributed to the study design, patient management, and manuscript writing, Abhivyakti Rajput: involved in the patient care, data collection, and clinical observations, Shashidhar Ojha, Shivendra Pal Singh: provided expertise in histopathological analysis and data interpretation, Priyanka Kacholiya, Ankita Nayyar: reviewed the manuscript for critical revisions and scientific accuracy.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this manuscript.

Declaration of Artificial Intelligence (AI) Assistance

This manuscript was supported by AI tools for content generation, grammar checking, and literature review. However, all interpretations, conclusions, and opinions presented are solely those of the authors.

Ethics Approval

Ethical approval was received from institutional ethics committee.

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