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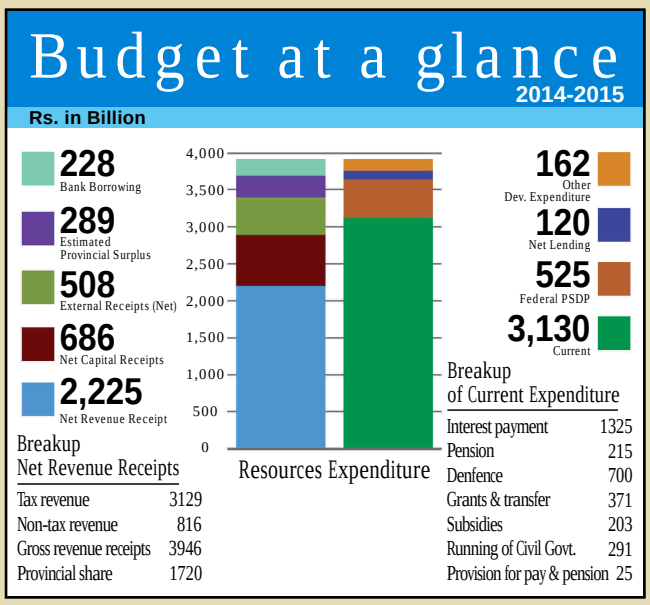
Government allocates Rs. 26.80 Billion for Health Budget in 2014-2015

By Kashif Arif



Another year has passed by and the ruling elite & legislators of Pakistan have, once again failed to respond generously to the health miseries and medical needs of the common man in this poor country.

The National Budget 2014-2015 was announced, among great expectations, but the poor masses were once again disappointed to see that; among the massive allocations made for the non-developmental expenditure & luxuries of the rulers, the Healthcare budget will be an insufficient fund of 26.80 billion Rupees. It surely cannot suffice for providing quality health services to more than 180 million people living in Pakistan today. Another meager amount of Rs. 31 million has been allocated as the additional fund to run the Prime Minister's Dengue and Pollen Allergy Programme over the next year. Following the 18th constitutional amendment, health has become a provincial subject. However, the federal government still runs several national health-related programmes, including the Expanded Programme on Immunisation, (EPI), Control of Diarrhoeal disease and National Institute of Health (NIH). The Prime Minister has also announced the intention of launching a health insurance scheme with **Rs. One Billion to help the poorest of segments.**The size of PSDP (Public Sector Development Programme) for

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Take drops or Travel stops

By Hashim Hasan

ISLAMABAD- The WHO has placed International travel restrictions on Pakistan, due to the country's failure in controlling the spread of wild polio virus, whereby 56 cases of polio were detected from different parts of the country. Most of these cases have primarily emerged from the Federally Administered Tribal Areas (FATA). An independent International Health Regulations Emergency Committee comprising of 21 members, was formed as per the recommendations of the World Health Organization (WHO). This committee discussed and reviewed the status of polio-affected countries.

The committee has made recommendations to Director General of WHO - Dr. Margaret Chan. It stated that; Over the past few months, serious concerns.

Pakistan government's ineffective efforts to control the disease. Pakistanis might soon be subjected to immense difficulties in visiting other countries, especially those that are polio-free. Pakistani's may need to provide medical certificates from authentic medical laboratories before traveling abroad and they might have to go through a medical check-up and tests at the destination airports. Such restrictions can be very detrimental for the country's economy and business community, which is already facing travel restrictions internationally, due to security reasons. The restrictions will further spoil the country's image. Ten nations were critically scrutinized due to active transmission of poliovirus over the recent six months; three of these countries are still endemic for the disease and seven have been re-infected.

Is WHO satisfied?

The World Health Organization (WHO) has expressed it's satisfaction with the initial steps taken by the government of Pakistan in an immediate response to the international travel restrictions. This will help in stopping the spread of wild poliovirus outside Pakistan's borders. This was stated in the UK by WHO's Polio Chief - Dr. Elias

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Pakistani Dental students win accolades in Dubai

DT Pakistan Report

LAHORE- The University of Health Sciences (UHS) had recently sent a six-member delegation to Dubai - UAE for attending the 2nd International Conference and Exhibition on Dental and Oral Health, where these young Pakistani students won several rewards for exceptional performance and competitiveness.The OMICS Group conducted this international conference, from 21st April to 23rd April. It brought together more than 1,000 faculty members, post-doctorate candidates, graduate students, and undergraduates from medical institutions from all over;

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President Mamnoon Hussain visits Dow University

DT Pakistan Report

KARACHI- As a token of appreciation for the outstanding services of Dow University of Medical Sciences in the educational and healthcare sector, the President of Pakistan Mr. Mamnoon Hussain recently paid a visit to the Dow University Ojha Campus in Karachi. The President was accompanied by the Governor of Sindh - Dr. Ishrat ul Ebad Khan and the provincial minister of Health – Dr. Sagheer Ahmed along with the Secretary Health – Mr. Iqbal Durrani. On this occasion, the Vice Chancellor of Dow University – Prof. Masood Hameed Khan, Pro-Vice Chancellor Prof. Umar Farooq welcomed the dignitaries at the Ojha campus. Prof. Masood Hameed Khan briefed the President about the numerous medical, academic and research activities carried out by the University, besides elevating the public health standards and facilities in the country. He also highlighted the future projects being initiated by the Dow University, and several healthcare institutions, established and operated by the university, during recent years.The President of Pakistan paid tribute to the relentless efforts and progress made by the university under the able guidance of Prof. Masood Hameed Khan. He expressed hope that the Dow University will continue with its efforts and formulate new endeavors to strengthen medical education and provide healthcare services in Pakistan. At the end of the ceremony, Prof. Masood Hameed presented a Memento Shield of the University to President Mamnoon Hussain.

Dental curriculum - time for change?

By Kashif Arif

We need to completely realign our curriculum after identifying the various social demographics and the diverse needs of each segment of our society – said Prof. Dr. Ayyaz Ali Khan (PhD – Community Dentistry)

The Medical and Dental Council of Bangladesh has recently approved a new curriculum for the Bachelor of Dental Surgery (BDS) programme, by extending their four-year programme to a duration of five years. The decision was taken in Dhaka to improve the knowledge-base, skill-set and global accreditation of Dental graduates in Bangladesh.

In Pakistan too, over the past several years, the medical and dental sector stakeholders and academicians have been repeatedly engaged in a similar debate over the appropriateness of our current health sciences curriculum, which was inherited way-back from the Britain Raj in the Subcontinent. Numerous debates were aimed to make the Pakistani graduates competent enough to cure the patients, using the latest advancements in medical sciences & techniques, while becoming more competitive on a global scale.

Prof. Dr. Ayyaz Ali Khan (PhD) – the leading dentist and researcher of Pakistan, in a statement given to Dental News recently said that; There is a need for total revamping of the failed to meet the needs of our society.

The current curriculum debate in Pakistan is mostly revolving around arguments on shuffling various topics from one subject to another. It totally ignores the importance of our social demographics. We do teach Implants to our under-graduates, but we forget that Implants is only 3% of the market needs.

Prof. Dr. Ayyaz Ali Khan further stated that; our grads are virtually ignorant of Paediatrics, although more than 25% of our society comprises of young citizens. We ignore the subject of Geriatrics, although 22% our society comprises of elderly people. The fresh dental graduate knows little about treatment considerations for Medically-compromised patients, despite the extremely high incidence of Diabetes and Hepatitis. We need to completely realign our syllabus after identifying the demographics and the diverse needs of each segment of our society. In order to create comprehensively trained dental surgeons, our BDS programmes might as well be extended to a duration of 6 years.

Another pioneering Dental Surgeon, seasoned academician and Editor of JPDA – Dr. Inayat ullah Padhiar commented on the curriculum, saying; There is a lack of research-orientation in our BDS programme curriculum, whereby our graduates donot gain sufficient skills or inspiration towards research or segmentation of their patients, which can lead them to qualify in the more demanded specializations. The society's demographics and disease-burden needs to be categorized according to the different regions in the country. Dr. Inayat feels that the regulatory guidelines provided by PMDC are similar to the globally accepted rules, however, as a nation we lack the will to implement the rules, strictly & prudently, in every aspect of our social and professional lives. Thus, more prudent behaviors are desirable in the field of dental education too.

"Our colleges are also accused of producing elitist doctors, who are best suited to practice in urban centers rather than in the less privileged rural communities. Our community based dental awareness programs are still in an infancy stage and are suffering from the neglect of higher decision making bodies and even of the dental professional organizations. We need to re-define the characteristics of our doctors to enable them to meet the specific needs of our health-deprived

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Free Health Insurance for poorest Pakistanis

By Kashif Arif

The Government of Pakistan has recently announced the National budget for the fiscal year 2014-2015, in which one big relief promised for the poorest segments of the society, is a Free Health Insurance Scheme being launched through a special financial allocation of One Billion Rupees. According to the plan of this pioneering effort, the allocated fund of One Billion Rupees should be enough to extend health insurance facilities to nearly 100 million common people. The implementation of this Pilot project has been spread over several phases. Each beneficiary of the Scheme will enjoy health coverage against tertiary diseases and special ailments. The scheme has recently recieved the approval from the prime minister, in the presence of the Youth Programme's Chairperson - Maryam Nawaz Sharif, Finance Minister, Health Minister, and top officials of these ministries.

The scheme will operate through the Health Ministry, and deliver the benefits through the joint efforts of authorized institutions including; Benazir Income Support Program (BISP) and National Database & Registration Authority (NADRA), who will also be responsible for systematic identification and selection of the most deserving beneficiaries.

It has been suggested that, each beneficiary may be issued a Health Insurance Card, which will be digitally identified at numerous designated medical institutions, for "Cash-Free" payment of healthcare expenditure. This scheme will also foster productive competition between public and private institutions. The scheme will begin specific districts, which are commonly known to be totally deprived of healthcare facilities since decades. In the next phase, it will be strategically expanded throughout the country. Slum dwellers and the most under-privileged segments of the population have been targeted as the primary beneficiaries. During the formulation of this scheme, the planners took some concepts from highly successful systems of "Social Security" and "Grievance Redressal" for the lowest income segment, adopted in the USA and other European Union States. Even the Indian method was studied, as it presents similar social and economic circumstances.

Prime Minister – Nawaz Sharif has expressed hope that; "the scheme will also enhance public-private partnership in Pakistan and will open up further avenues for investment". Maryam Nawaz Sharif has commented that; The scheme is designed on simple lines to ensure cost efficiency, and will be devoid of any political influence. It will provide a blanket cover for cash-free treatment to poor people for major diseases including; Cardiovascular, Diabetes Mellitus, life and limb saving treatment, implants, prosthesis, end-stage renal diseases and dialysis, chronic infections (hepatitis), organ failure (hepatic, renal, cardio-pulmonary) and cancer treatment (chemotherapy, radiation & surgery). The high-level participants of the meeting have also agreed upon the establishment of a pioneering, cutting-edge organ transplant centre in Islamabad. The relevant ministries have been instructed by the Prime Minister, to finalize all the technical modalities and collaborate swiftly, to provide the earliest possible relief to the suffering humanity.

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"Aesthetic dentistry in itself means nothing"

An interview with Dr. Pascal Magne, USA

Dr. Pascal Magne

Success in aesthetic dentistry depends on biology, function and mechanics; aesthetic dentistry cannot exist independently. cosmetic dentistry had the opportunity to speak with Dr. Pascal Magne, a specialist in aesthetic dentistry, lecturer, author of many clinical and research articles and the well-known book Bonded Porcelain Restorations, and associate professor at the University of Southern California in Los Angeles, where he holds the Don and Sybil Harrington Foundation Chair in Esthetic Dentistry, about the latest trends in modern restorative dentistry at the 12th Annual Scientific Conference of the Polish Academy of Esthetic Dentistry and Art Oral, which was held in June 2013 in Sopot, Poland.

cosmetic dentistry: Dr. Magne, you created an impressive training programme on aesthetic restorative dentistry and have become one of the most reputable lecturers on this topic. What is the philosophy underlying your success?

Dr. Pascal Magne: I believe that success needs to be defined first. Success at work, success in life, personal success? Often, professional success has been obtained by sacrifice of a personal nature. Can it then still be considered success?

I strongly believe in what I call "balanced success", meaning that the most important values, such as spirituality and family, are preserved. I also believe in mentorship.

My advice to young colleagues is to choose one mentor (or several), a kind of dental parent. I know it is not easy to find such a person but it is worth the search. I have been blessed in my career to have three mentors, my clinical mentor, Prof. Urs Belser (University of Geneva); my research mentor, Prof. William Douglas (University of Minnesota); and my dental technique mentor, my brother Michel (university of „life"). Of course, none of this would have been possible without my mentor above all, my Lord Jesus, and I pray to receive his inspiration every day. One of my favourite quotes is Proverbs 16:9: "In his heart a man plans his course, but the Lord determines his steps."

What are current concepts in aesthetic restorative dentistry? In which direction is aesthetic dentistry developing?

Fig. 1 Partial bonded restorations teeth 13 to 23 (porcelain by Michel Magne, Oral Design Beverly Hills, on teeth 12–22). (Image courtesy of European Journal of Esthetic Dentistry)

Fig. 2 Partial bonded restorations teeth 13 to 23 (porcelain by Michel Magne, Oral Design Beverly Hills, on teeth 12-22) in black and white. (Image courtesy of European Journal of Esthetic Dentistry)

Aesthetic dentistry in itself means nothing; it is contingent on biology, function and mechanics. Aesthetic dentistry is the cherry on the cake for those who follow sound biomimetic concepts in restorative dentistry. Above all, as described by Rev. W. John Murray in his book The Realm of Reality, "the aesthetic is itself nothing more than a beautiful symbol of the spiritual, without which spiritual, the aesthetic is a shadow without substance".[1]

I like to remind my patients that they can always have internal beauty, the beauty of the heart, which surpasses physical aesthetics. That said, if we look at your question from a more technical perspective, the answer lies in the biomimetic approach to restorative sciences,which in turn is dependent on adhesive dentistry and minimally invasive approaches - no post, no crown dentistry.

Restorative dentistry is likely to evolve in a manner similar to technological advancements in general. If you have a smartphone, you know what I mean. CAD/CAM and technology will be used increasingly, and I hope for the best, meaning just as an additional tool in our armamentarium and not as an excuse to treat more patients. I believe we will stop using posts, crowns and metal alloys, and stop performing intentional endodontics eventually—this has already happened for many of us who believe in the biomimetic approach.

My hope is that technology will make better treatment accessible to more patients, with a reduced need for root-canal treatment and crown lengthening. I see an increase in the diagnosis of diet-related problems and improved differential diagnosis between wear- and erosion-related lesions. Such cases will force us to strive for the solution that will preserve as much of the tooth as possible (keep the pulp alive using non-re - tentive preparation) that is no-post no-crown restorative dentistry. In summary I would say for the future less is more (minimally invasive). We will learn to think differently, think biomimetically, think bonding. Technically, good bonding implies some cardinal rules: good isolation (very important; ideally a rubber dam) and knowledge of your materials, products, and procedures. A checklist is the best aid—this is similar to pilots going through a checklist before flying an airplane!

Dentists need to have a look at sound, un - biased literature before choosing products. Manu facturers do not always sell the best product but rather the most convenient one. Many new products today have been developed in response to the pressure of the market; for example, one company starts a new trend and then all the other companies follow with competing products even if this trend does not yield the best per - formance. It is business driven. It happens a lot.

I would say that dentists need to undergo training and gain as much experience as possible because we know that the operator factor is even more critical than the choice of product and technique. This is why as an academic I want my students to have as much experience as possible with the materials and techniques that are going to represent their daily bread when they start their practice. Today, we can no longer ignore that adhesive dentistry is this daily bread.

Is it possible to reproduce the original stiffness of a tooth? How can this be achieved?

Absolutely! Much research, starting in the early 1980s, has demonstrated that adhesive forces obtained solely on enamel can restore the original stiffness of a tooth. Various degrees of stiffness are obtained with a combi - nation of dental adhesives, composite resins and ceramics that simulate dentine and enamel, respectively.

One of the objectives of your courses is to explain a new biomimetic approach to restorative dentistry. What is this concept about?

I can respond in two words: mimicking nature. As said earlier, it implies first respecting biological parameters, such as pulp vitality— once lost, the pulp will not come back and we know that a non-vital tooth has a poor prog nosis—then emulating mechanical function as intended by nature. This will ultimately form an aesthetic and pleasing whole with the tooth because dental materials that are able to simulate the mechanical properties of dentine and enamel are also available in tooth colours.

This is the fundamental difference between a filling (old alloy restorations) that only fills a cavity like an obturator and one that rehabilitates the biomechanics of the tooth. Biomimetic research is changing dentistry using apparently weak materials synergistically to simulate enamel and dentine. After all, enamel is extremely brittle (more brittle than glass) and dentine absolutely not wear resistant; yet, together (bonded) they can make a tooth that can withstand stress and function for a lifetime. How do you explain that? That is synergy! What I call the "dental trinity" (enamel, dentine and dentino-enamel junction) should be the model and we can realistically approach this model today with the structured use of porcelain/ceramics, composite resin, and enamel and dentine bonding agents. Adhesive dentistry is the cornerstone of this process. Even endodontically treated teeth can benefit from this approach because the remaining enamel and dentine can be preserved. Adhesive dentistry today is capable of producing continuity between the ceramic/polymer and the tooth, and above all allows us to save a great deal of intact tooth structure (adhesion replacing retention and resistance form). It would be foolish to ignore bonding techniques today and remove precious enamel and dentine instead. In summary, it is not about aesthetics but about tooth-conserving dentistry. I believe biomimetic research will allow us to develop better solutions for tooth replacement. Currently, dental implants are not biomimetic per se because of the lack of periodontal ligament, extreme stiffness, etc. (they are only indirectly biomimetic because they do not require the neighbouring teeth to be altered). We are looking at ways to make them more biomimetic through the use of materials that are more compliant2 and even adhesive techniques - bonding to implant abutments can be very useful.3

What is your view of the role of CAD/CAM techniques in modern aesthetic restorative dentistry? Is this the future or just a temporary trend?

It is a growing trend, and it will grow not only as a restorative tool but also as a diagnostic tool through the inclusion of various modules, such as wear/erosion monitoring, caries detection, etc. I strongly believe in CAD/CAM but only as a tool, not a philosophy of work. That means that the operator still needs to have his or her own core values, treatment planning strategies, etc. that are totally independent of the tools that are used to reach the treatment objective.

You have lectured all over the world. What do you think dental education today should entail? What should its main objective be?

I believe that an effective educator should be imbued with passion and knowledge, and must infect others with this passion and knowledge.

His or her teaching must be based not only on science, but also on common sense and experience. The educator must not hide anything, especially not his or her failures.

When listening to such a teacher, dentists taking the course should feel empowered with new abilities to provide their patients with durable treatments that are better adapted and more conservative.

Ideally, this kind of teacher should be a model in his or her personal life too. This is the difference between just having success and being a successful human being. I am not saying that I am a successful human being but I strive to be. Albert Einstein once said, "I want to know God's thoughts; the rest are details."

The main objective of dental education should be to establish very strong core values; values that will not age, that will be timeless. We know that ten years from now, most of the materials and tools that we use today will have been supplanted by new ones.

So I always ask my colleagues, "What is it that you would like to be remembered for when you retire?". This question usually calls for a deep reflection about one's values.

Deep respect for God's creation, including teeth, and trying to emulate it - this is the kind of value that I want to pursue.

Thank you very much for the interview; it was very inspiring.

Editorial note: A complete list of references is available from the publisher.

CBCT in endodontic treatment of fused second & third mandibular molars

Authors Dr. Andreas Krokidis, Greece, & Dr. Riccardo Tonini, Italy

Abstract
The aim of this article is to report a rare anatomic case and the contribution of new technologies in best resolving it. Fusion is defined as the union of two separate tooth germs at any stage of tooth development. Planning treatment for this condition can be difficult and requires all diagnostic means available. A 45-year-old female patient presenting with a fused second and third molar underwent endodontic treatment and direct restoration after CBCT imaging revealed a direct relationship between the two germs. The treatment was successful once the correct diagnosis had been made.

Introduction
Fusion is defined as the union of two separate tooth germs at any stage of tooth development. Fused elements may be attached at the dentine or enamel. This process involves the epithelial and mesenchymal germ layers, and results in irregular tooth morphology.[1] Depending on the stage of development in which the fusion occurs, pulp chambers and canals may be linked or separated.

The reason for this phenomenon is unknown, but genetic factors, physical forces, pressure, and trauma may be influencing factors.[2] The prevalence of dental fusion is higher in primary dentition (0.5–2.5%) than in permanent dentition (0.1%); in both cases, the anterior region has the highest prevalence.[3] The incidence is the same between males and females. Cases of affected posterior teeth are rare in the literature. Most posterior teeth are fused with fourth molars (supernumerary). Fusion between premolars and molars or second and third molars has also been reported, but is less common. In some reported cases, teeth are bilaterally fused with supernumerary molars.[4–9] In these cases, the number of teeth in the dental arch is also normal and differentiation from gemination is clinically difficult or impossible. A diagnostic consideration, but not a set rule, is that supernumerary teeth are often slightly aberrant and have a cone-shaped clinical appearance. Thus, fusion between a supernumerary and a normal tooth will generally involve differences in the two halves of the joined crown. However, in gemination cases, the two halves of the joined crown are commonly mirror images.[9]

Periodontic problems occur as a part of the pathology in these cases.[5–8] A high prevalence of caries also occurs due to anatomically abnormal plaque retention. In the anterior region, an anti-aesthetic effect occurs owing to the abnormal anatomy. In contrast, crowding and occlusal dysfunction may occur in the posterior region, especially in cases with supernumerary teeth, which often leads to tooth extraction.[5,10,11]

Fused teeth are usually asymptomatic. The collaboration of practitioners with expertise in multiple areas of dentistry is important to create or achieve functional and aesthetic success in these cases. Several treatment methods have been described in the literature with respect to the different types and morphological variations of fused teeth, including endodontic, restorative, surgical, periodontal, and orthodontic treatment.[3–6,10–12]

In cases in which endodontic therapy is indicated, clinicians must be very careful during access because anatomy is not predetermined and canals may be displaced from their normal position, depending on the position of the two germs and whether the teeth involved are part of the normal dentition or supernumerary. For this reason, clinicians should examine the element meticulously, both clinically and radiographically. This case report demonstrates the usefulness of a CBCT scan in addition to conventional intra-oral X-rays from different projections in diagnosing and designing appropriate treatment for this rare case.[13,14]

Case presentation
A 45-year-old woman was referred by an oral surgeon who had proposed an extraction of the last mandibular molar because of pain and abnormal anatomy. The patient complained of pulsing pain in the right side of the oral cavity, which extended to the ear region and worsened at night.

After a comprehensive extra-oral and intra-oral examination, the pain was found to be localised to the region of teeth 47 and 48 (Fig. 1). Both cold and hot stimuli consistently caused pain in those teeth. An obvious anatomic abnormality noted during the clinical examination was confirmed with intra-oral X-rays using a parallel-cone technique and various projections.The X-ray (Fig. 2) also revealed a deep amalgam restoration extending into the pulp chamber, which had been infiltrated, and distal caries in the fused tooth. A deep carious lesion was also observed on tooth 46, but a simple filling was scheduled because the tooth responded normally to cold and hot stimuli.

In this case, the treatment plan was determined to be root-canal therapy for the pulpitis in the fused tooth and a direct restoration for the same tooth. In addition, dental hygiene sessions were scheduled for the patient because of generalised plaque and to avoid worsening of periodontal conditions in the area of the fused tooth. Direct restorations were also arranged with the general practitioner to avoid any other pulp implications in other teeth with marked infiltrated restorations. Initially, the treatment plan was targeted at the root-canal therapy of the fused tooth, which was urgent. In order to clarify the anatomy of this element, a CBCT examination was also performed; it revealed two independent mesial roots (lingual and buccal) and a single distal root. The fused root in the middle involved two independent canals ending in the same area (Figs. 3 & 4).

After anaesthetic with 1:100,000 lidocaine had been administered, the tooth was isolated with a rubber dam (KKD, Sympatic Dam). Because of the abnormal anatomy, the use of a liquid photopolymerising dam (DAM COOL, Danville Materials) was necessary to seal gaps completely and to avoid leakage of saliva into the treated tooth and sodium hypochlorite into the patient's mouth. An extended access cavity using a 1.2 mm cylindrical bur and a #2 Start-X ultrasonic tip (DENTSPLY Maillefer) was created to visualize all five orifices (Fig. 5). Once the surface was clean and canals were visible, negotiation with hand files (K-files) and Path Files (DENTSPLY Maillefer) was performed to ensurepatency of the canals. First #10 and #08 K-files (if needed) were alternated along the canals with copious irrigation with sodium hypochlorite and using 17% EDTA gel (B&L Biotech) until the #10 file was at the apex. Working length was measured with an apex locator (Root ZX, Morita). Afterwards #1–3 PathFiles were used until the #3 file reached working length in all five canals. Once patency had been confirmed, working length was also confirmed radiographically (Fig. 6). The next step was to shape the canals using reciprocating files (WaveOne, DENTSPLY Tulsa Dental Specialties) with a single-file reciprocating technique. Since the anatomy was slightly different, the shaping technique was changed. After the primary file (25.08, red code), apical gauging was performed with manual NiTi K-files (ISO) to measure the apical restriction diameter. For the distal canal, the large file was also needed. Throughout the procedure, irrigation with preheated 5.25% sodium hypochlorite was performed with 30g irrigating needles (NaviTip, Ultradent) and the irrigant was activated with IrriSafe files (ACTEON).[15–17] Once the shaping had been completed, apical diameter was confirmed through apical gauging, and cones were fitted. Irrigation with preheated and activated 17% EDTA solution (Vista Dental Products) was used to remove inorganic debris from the canals. Canals were then dried with paper cones and the roots were sealed with vertical condensation of hot gutta-percha (Endo-2 B&L Biotech) with standardised gutta-percha cones and Pulp Canal Sealer. Back-filling was performed with warm liquid gutta-percha (SuperEndo-B&L Biotech; Figs. 7 & 8). The treatment was completed with a direct composite restoration (Figs. 9 & 10). All treatment was performed under clinical microscope (OMNI pico, Zeiss).

The patient kept to her treatment plan and attended several recall appointments after the rootcanal therapy. She also attended six-monthly oral hygiene appointments with the dental hygienist (Figs. 11–13).

Fig. 1 Initial clinical situation. Observe the plaque in the lingual side in the fusion area and discoloration due to caries. **Fig. 2** Initial X-ray situation. **Fig. 3** Reconstruction.

Fig. 4 Axial images where fusion is obvious. **Fig. 5** Access cavity. Non-conventional shape due to abnormal anatomy. **Fig. 6** Working length X-ray.

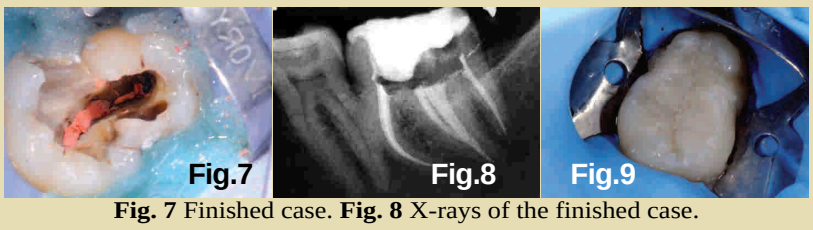

Fig. 7 Finished case. **Fig. 8** X-rays of the finished case. **Fig. 9** After restoration.

Fig. 10 After restoration. **Fig. 11** One-year recall X-ray. **Fig. 12** One-year recall.

Discussion
Treatment planning for rare conditions such as fused teeth is fundamental to the success of each case. For this reason, clinicians must consider every parameter before starting treatment. In this case, a tooth extraction would have been the likely outcome without a CBCT examination. Because the fused teeth complex did not involve any occlusal or periodontal problems, the extraction would have caused significant biological damage and held significant financial implications. Once a treatment plan was in place, a CBCT scan was very helpful in determining the exact position of the canals and in designing the access cavity according to the exact anatomy, which was different from that of a normal single tooth. The single-file reciprocating technique chosen for this case was adapted to the need of the tooth. Since the anatomy was complex, the direct use of a large file in the distal root might have failed. Had different diameters been established during apical gauging, the shaping technique would have been changed and more files would have been introduced. For this reason the shaping technique was modified using more files for this particular root.

Conclusion
In conclusion, this case demonstrates the importance of treatment planning. In designing a treatment plan, all diagnostic methods should be considered. In this case, a CBCT examination resulted in a successful and predictable treatment.

Editorial note: A complete list of references is available from the publisher.

contact roots

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Stem Cells in Implant Dentistry

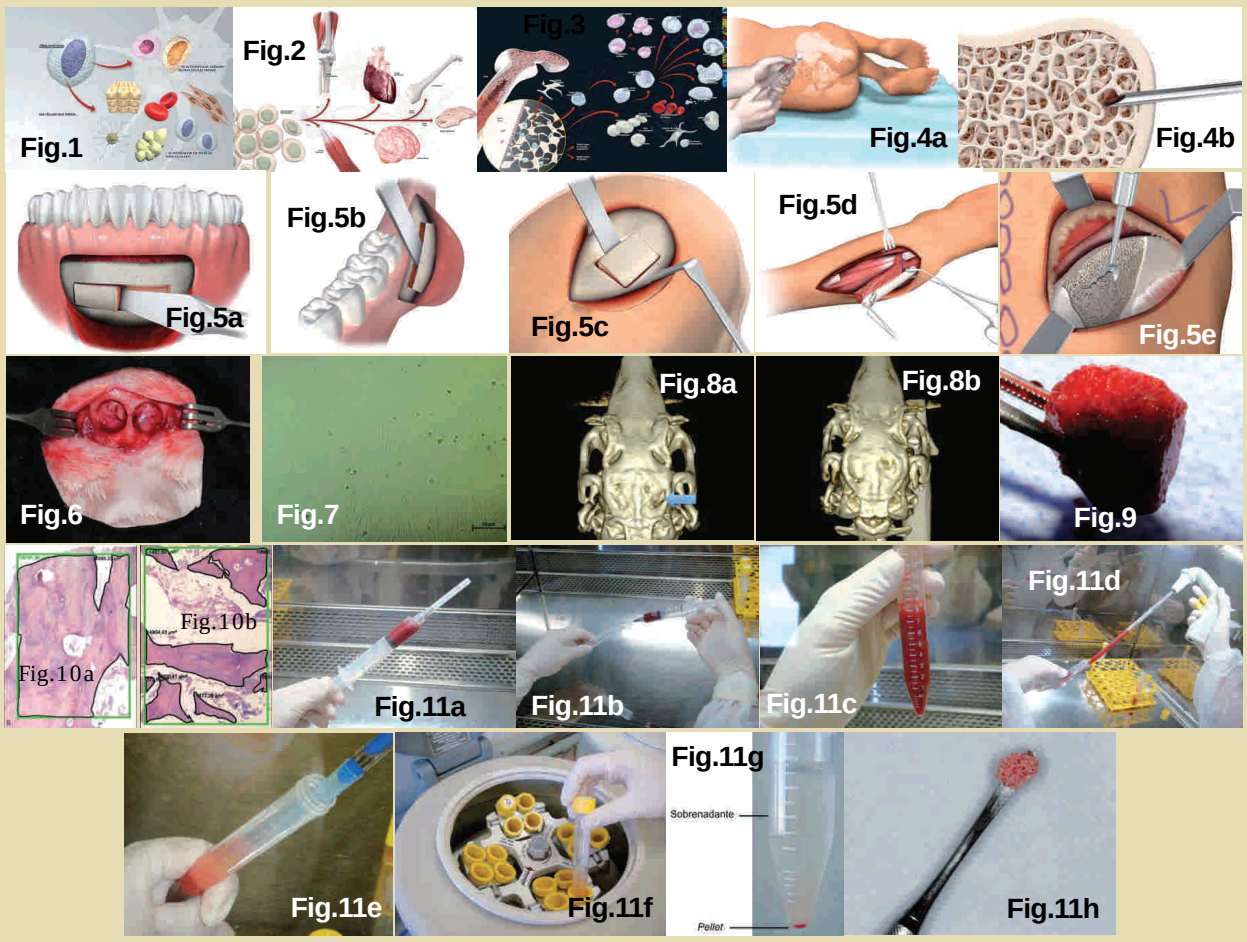

Fig. 1 A stem cell following either self-replication or a differentiation pathway.
Fig. 2 Different tissues originated from mesenchymal stem cells.
Fig. 3 The diversity of cell types present in the bone marrow.
Fig. 4a Point of needle puncture for access to the bone marrow space in the iliac bone.
Fig. 4b The needle inside the bone marrow.
Fig. 5a A bone graft being harvested from the chin (mentum).
Fig. 5b A bone graft being harvested from the angle of the mandible (ramus).
Fig. 5c A bone graft being harvested from the angle of the skull (calvaria).
Fig. 5d A bone graft being harvested from the angle of the leg (tibia or fibula).
Fig.5e A bone graft from the pelvic bone (iliac).
Fig. 6 A critical bony defect created in the skull (calvaria) of a rabbit.
Fig. 7 A primary culture of adult mesenchymal stem cells from the bone marrow after 21 days of culture.
Fig. 8a A CT image of a rabbit's skull after bone-sparing grafting without stem cells (blue arrow). Note that the bony defect remains.
Fig. 8b A CT image of a rabbit's skull after bone-sparing grafting with stem cells. Note that the bony defect has almost been resolved.
Fig. 9 A bone block from a musculoskeletal tissue bank combined with a bone marrow concentrate.
Fig. 10a A histological image of the site grafted with bank bone combined with bone marrow.
Note the presence of considerable amounts of mineralised tissue.
Fig. 10b A histological image of the site grafted with bank bone not combined with bone marrow.
Note the presence of low amounts of mineralised tissue.
Fig. 11a Bone marrow.
Fig. 11b Bone marrow transfer into a conic tube in a sterile environment (laminar flow).
Fig. 11c Bone marrow homogenisation in a buffer solution (laminar flow).
Fig. 11d Bone marrow combined with Ficoll (to aid cell separation).
Fig. 11e Pipette collection of the interface containing the mononuclear cells (where the stem cells are present).
Fig. 11f Second centrifuge spin.
Fig. 11g The pellet containing the bone marrow mononuclear cells after the second centrifuge spin.
Fig. 11h A bovine bone graft combined with a bone marrow stem cell concentrate.
All images courtesy of Células Tronco em Implantodontia.[2]

Author: Dr. André Antonio Pelegrine, Brazil

The human body contains over 200 different types of cells, which are organised into tissues and organs that perform all the tasks required to maintain the viability of the system, including reproduction. In healthy adult tissues, the cell population size is the result of a fine balance between cell proliferation, differentiation, and death. Following tissue injury, cell proliferation begins to repair the damage. In order to achieve this, quiescent cells (dormant cells) in the tissue become proliferative, or stem cells are activated and differentiate into the appropriate cell type needed to repair the damaged tissue. Research into stem cells seeks to understand tissue maintenance and repair in adulthood and the derivation of the significant number of cell types from human embryos. It has long been observed that tissues can differentiate into a wide variety of cells, and in the case of blood, skin and the gastric lining the differentiated cells possess a short half-life and are incapable of renewing themselves. This has led to the idea that some tissues may be maintained by stem cells, which are defined as cells with enormous renewal capacity (self-replication) and the ability to generate daughter cells with the capacity of differentiation. Such cells, also known as adult stem cells, will only produce the appropriate cell lines for the tissues in which they reside (Fig. 1). Not only can stem cells be isolated from both adult and embryo tissues; they can also be kept in cultures as undifferentiated cells. Embryo stem cells have the ability to produce all the differentiated cells of an adult. Their potential can therefore be extended beyond the conventional mesodermal lineage to include differentiation into liver, kidney, muscle, skin, cardiac, and nerve cells (Fig. 2).

The recognition of stem cell potential unearthed a new age in medicine: the age of regenerative medicine. It has made it possible to consider the regeneration of damaged tissue or an organ that would otherwise be lost. Because the use of embryo stem cells raises ethical issues for obvious reasons, most scientific studies focus on the applications of adult stem cells. Adult stem cells are not considered as versatile as embryo stem cells because they are widely regarded as multipotent, that is, capable of giving rise to certain types of specific cells/tissues only, whereas the embryo stem cells can differentiate into any types of cells/tissues. Advances in scientific research have determined that some tissues have greater diffi culty regenerating, such as the nervous tissue, whereas bone and blood, for instance, are considered more suitable for stem cell therapy. In dentistry, pulp from primary teeth has been thoroughly investigated as a potential source of stem cells with promising results. However, the regeneration of an entire tooth, known as third dentition, is a highly complex process, which despite some promising results with animals remains very far from clinical applicability. The opposite has been observed in the area of jawbone regeneration, where there is a higher level of scientific evidence for its clinical applications. Currently, adult stem cells have been harvested from bone marrow and fat, among other tissues.

Bone marrow is haematopoietic, that is, capable of producing all the blood cells. Since the 1950s, when Nobel Prize winner Dr. E. Donnall Thomas demonstrated the viability of bone marrow transplants in patients with leukaemia, many lives have been saved using this approach for a variety of immunological and haematopoietic illnesses. However, the bone marrow contains more than just haematopoietic stem cells (which give rise to red and white blood cells, as well as platelets, for example); it is also home to mesenchymal stem cells (which will become bone, muscle and fat tissues, for instance; Fig. 3).

Bone marrow harvesting is carried out under local anaesthesia using an aspiration needle through the iliac (pelvic) bone. Other than requiring a competent doctor to perform such a task, it is not regarded as an excessively invasive or complex procedure. It is also not associated with high levels of discomfort either intra or post-operatively (Figs. 4a & b). Bone reconstruction is a challenge in dentistry (also in orthopaedics and oncology) because rebuilding bony defects caused by trauma, infections, tumours or dental extractions requires bone grafting. The lack of bone in the jaws may impede the placement of dental implants, thus adversely affecting patients' quality of life. In order to remedy bone scarcity, a bone graft is conventionally harvested from the chin region or the angle of the mandible. If the amount required is too large, bone from the skull, legs or pelvis may be used. Unlike the process for harvesting bone marrow, the process involved in obtaining larger bone grafts is often associated with high levels of discomfort and, occasionally, inevitable post-operative sequelae (Figs. 5a–e).

The problems related to bone grafting have encouraged the use of bone substitutes (synthetic materials and bone from human or bovine donors, for example). However, such materials show inferior results compared with autologous bone grafts (from the patient himself/herself), since they lack autologous proteins. Therefore, in critical bony defects, that is, those requiring specific therapy to recover their original contour, a novel concept to avoid autologous grafting, involving the use of bone-sparing material combined with stem cells from the same patient, has been gaining ground as a more modern philosophy of treatment. Consequently, to the detriment of traditional bone grafting (with all its inherent problems), this novel method of combining stem cells with mineralized materials uses a viable graft with cells from the patient himself/herself without the need for

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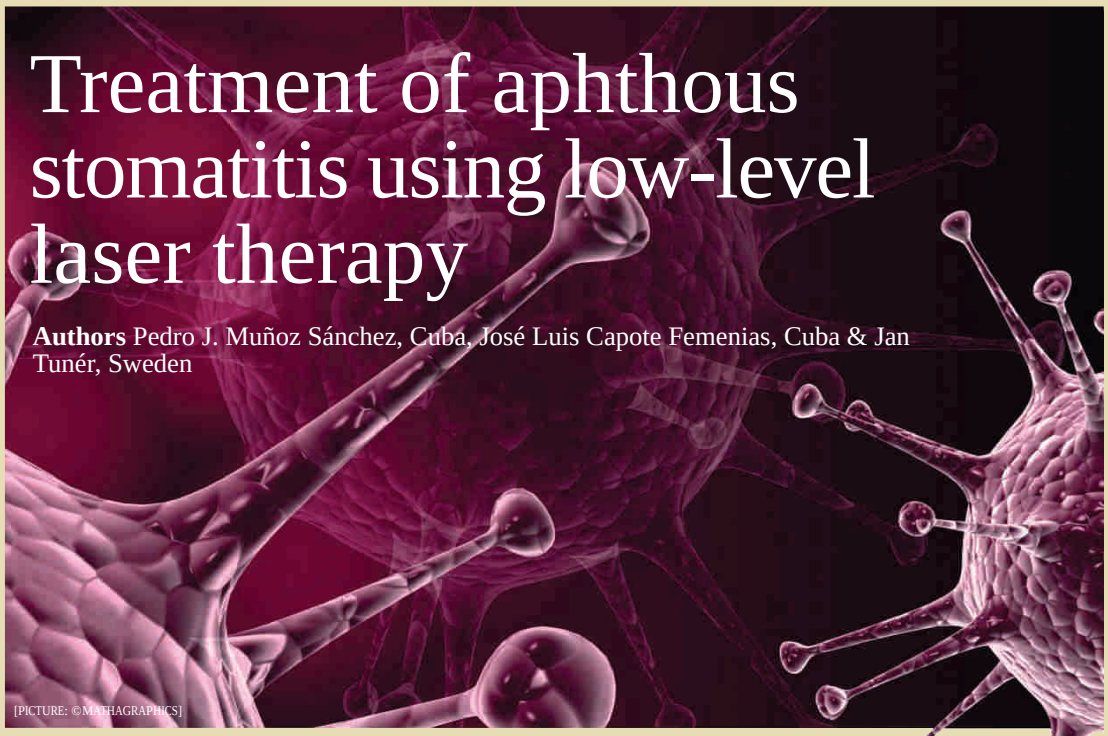
Treatment of aphthous stomatitis using low-level laser therapy

Authors Pedro J. Muñoz Sánchez, Cuba, José Luis Capote Femenias, Cuba & Jan Tunér, Sweden



[PICTURE: ©MATHAGRAPHICS]

Introduction

Aphthous stomatitis has been investigated to a great extent; however, the aetiology of these lesions is still to be identified accurately. Recurrent aphthous stomatitis is considered a chronic illness accompanied by painful oral ulcers that reappear with irregular frequency.

The following categories have been described: smaller aphthous ulcers (80–85% of cases; of a diameter of 1–10mm; healing spontaneously in seven to ten days);larger aphthous ulcers (Sutton's disease; 10–15% of cases; of a diameter larger than 10mm; healing spontaneously within ten to 30 days or more; may leave a scar); and herpetiform ulcers (5–10% of cases; multiple clusters of lesions of a diameter of 1–3mm, which can coalesce into larger erosions; healing in seven to ten days).[1]

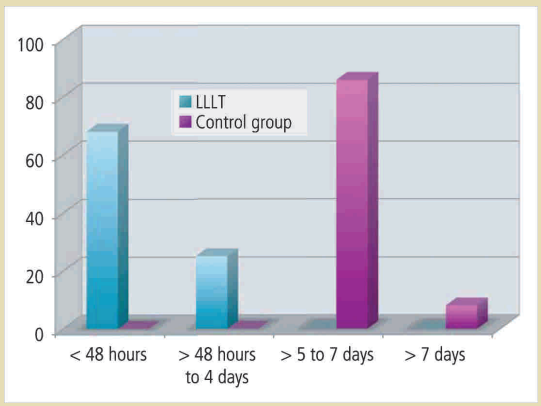
The predisposing factors of recurrent aphthous ulcers are speculative; among them are trauma, emotional stress, coeliac disease, hormonal changes, hypersensitivity to certain foods, allergic reactions and intoxications.[1] It is believed that aphthous stomatitis affects 20 % of the US population and studies have demonstrated a worldwide prevalence of 31–66%.[2] It is important to highlight that the diagnosis of aphthous stomatitis is primarily clinical and should be differentiated from systemic conditions, such as coeliac disease, Crohn's disease, herpes simplex virus Type I, Reiter's syndrome, syphilis, systemic lupus erythematosus, T cell disorders, chicken pox and B6 deficiency.[3–7]

The benefits of local therapies have been demonstrated with anaesthetics and cortico steroids, applied in prodromal stages or in early stages of the lesions. When treating with systemic steroids, it is important to consider the course of the ulcer.[8–21] According to reports from Cuba, treatment with lowlevel laser therapy (LLLT) is effective, achieving rapid relief of pain, quicker wound healing and lower frequency of recurrence.[22–24] The aim of the present clinical unblinded study was to evaluate the prevalence of aphthous stomatitis in various age groups, as well as the effect of LLLT in the treatment of aphthous stomatitis.

Material and methods

An experimental study was carried out in patients with a clinical diagnosis of aphthous stomatitis attending the Leonardo Fernández Sánchez dental clinic in Cienfuegos in Cuba between September 2010 and March 2011. Among the 252 patients registered, 208 attended the clinic until the lesions had healed completely. The study was approved by the Scientific Council of the University of Medical Sciences, Cienfuegos. All of the patients were informed about the parameters of the study and gave their informed consent. LLLT was administered to 104 patients (study group) and the remaining 104 (control group) received conventional treatment, such as topical anaesthetics (2% lidocaine), dietary advice and oral painkillers. Every second patient with the same type of ulcer was allocated to either the study or the control group. The two groups consisted of 56 males and 148 females, with a great variation in age distribution (Table 1).

All of the patients were seen daily and the patients in the study group received LLLT every second day



unless their ulcer had already healed. The patients were categorised with regard to age and ulcer type (Tables 1 & 2). Special diagnostic procedures were performed in patients with large ulcers to confirm a safe differential diagnosis. Pain was evaluated, but since pain is subjective, it was decided only to register the time until wound closure (Fig. 1), which can be registered objectively. No patient in the study group reported any negative effects of the laser irradiation. The laser used was the Lasermed 670DL (Cuban manufactured), 670nm, 40mW. Each ulcer underwent 40 seconds of irradiation at 1.6 J, 2.04J/cm^2 and 51mW/cm^2 from a distance of about 0.5cm. The parameters used were based upon the successful application of these in a previous study on herpes simplex virus Type I blisters.[32]

The study was unblinded. A 660 nm laser emits clear red light and, although a patient-blinded design is possible, it is not possible to mask a placebo laser for the therapist.

Sex	Age group (years)					Total
	0-9	10-19	20-39	40-59	60+	
Man	4	4	16	24	4	52
Woman	4	20	48	52	28	152
Total	8	24	64	76	32	204

Clinical type	Age group (years)					Total
	0-9	10-19	20-39	40-59	60+	
Small ulsers	4	24	60	64	28	180
Large ulsers	-	-	8	12	-	20
Hepitiform ulcers	-	-	-		4	4
Total	4	24	68	76	32	204

Clinical type	Age group (years)		Total
	Study group	Control group	
Small ulsers	92	92	184
Large ulsers	8	-	16
Hepitiform ulcers	4	4	4
Total	104	100	204

The distribution of the age of the patients, of the types of ulcer according to age, and of the types of ulcer in the study and control groups is shown in Tables 1–3. This data corresponds with the literature, where smaller aphthous ulcers represent 80–85% of cases, larger ulcers 10–15% and herpetiform ulcers 5–10%.[1]

Results

The main results of the study are presented in Figure 1. The results shown are for small ulcers, which were the dominant type of ulcers treated. As for the large ulcers in the study group, four scarred between two and four days, and another four scarred between five and seven days. In the control group, eight large ulcers scarred within seven days. For ethical reasons, and because of the small number of cases, the four herpetiform ulcers were all treated with laser. They healed between two and four days. According to the literature, the normal healing time with no treatment is seven to ten daysfor small aphthous ulcers, ten to 30 days for large aphthous ulcers, and seven to 14 days for herpetiform ulcers.[1, 3]

Discussion

The use of LLLT to treat aphthous stomatitis was suggested in 1986 already by Quang-Hua[25] using a helium–neon laser and in 1987 by Von Alften[26] using a gallium arsenide laser. Recent studies, such as the one by De Souza et al.[27] have used a laser similar to ours, 670nm, 50mW, 3J/cm^2. It therefore appears that the wavelength itself is not decisive. Indeed, Zand et al.[28] report good results using a carbon dioxide laser at non-thermal levels in combination with a transparent gel to reduce beam absorption. Surgical lasers have also been reported to be effective, but the mechanism here ought to be different, since it entails superficial tissue evaporation. Tezel et al.[29] report fair results using an Nd:YAG laser, while the erbium laser in addition can be used for surface modification of the lesion and pain relief.[30]

The biological mechanism behind the effect of the various lasers is still unknown. The power setting used in our study was rather low and the effect of higher power settings needs to be investigated. Another aspect is the number of sessions. In our study, the patients were treated every second day until wound closure had been achieved. In the De Souza study,[27] patients were treated daily until an obvious result was observed. Only four patients with a herpetiform ulcer took part in the current study. Although these ulcers responded well to LLLT, no definite conclusions can be drawn, since all four were included in the study group.

Patients typically have an occasional aphthous ulcer. The problem arises in patients with recurrent aphthous ulcers. The frequency of recurrence was not investigated in our study, but no presently available treatment has been able to reduce recurrence.[31] However, such a possibility is suggested in some sources.[22–24] In a recently published study,[32] our clinic found that LLLT reduced the recurrence frequency in herpes simplex virus Type I patients. Although aphthous ulcers are different to herpes simplex virus Type I blisters, LLLT might reduce their frequency of recurrence too.

Conclusion

LLLT appears to be a safe and effective option for treating aphthous stomatitis. The distribution of aphthous stomatitis in the various age groups was found to be in accordance with previous reports.[33] Further studies are warranted to investigate the optimal laser parameters and frequency of irradiation.

Statement

The present study was financed by the authors and their clinics. Pedro J. Muñoz Sánchez and José Luis Capote performed the clinical part. Jan Tunér served as scientific advisor and authored the manuscript.

Editorial note: A list of references is available from the publisher.

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