Pedonomics: lasers in paediatric dentistry

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We live in an era in which time is the basis for many decisions: what saves time is what gets chosen. Introducing better technology helps to work with time economics in paediatric dentistry. The recent term coined for this perspective of expanded thinking is "Pedonomics". Pedonomics refers to the impact of the changing world of paediatric dentistry in the dental practice.[1]

Time economics goes hand in hand with pedonomics. The selective niches of dentistry are expanding far more today than in the past years. Few reasons that account for the need of this level of advanced healthcare are:[2]

1. Some parents who have their children later in life are referred to as drone parents. These parents self-educate a lot via social networks and extensive internet research. With less inherent trust in healthcare providers, they generally form a strong opinion about the dental care of their children and are most demanding of their paediatric dentist.
2. This category of parents are often techno-savvy and are quite updated with latest technologies. They appreciate a "no pain, no drill, no memory" dentistry.
3. Caries rate in dentistry is ever-increasing, with a heightened frequency of cariogenic diet and a decline in caries prevention.
4. There are more and more general dentists that would "do the job" and only if it is mismanaged, would they refer the child to the specialist. Increased availability of advanced technology can put an end to this trial practice.


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Lasers as game changers

Lasers are introduced as excellent instruments in everyday dentistry. However, the idea of dentistry is generally connected to discomfort and pain in children's minds. Any treatment trend that can help our practice to remove this connection by the use of contemporary technologies can increase patient referrals and treatment acceptance.

Although the hand piece does remove the dental decay, it may also cause abrasion of the tooth structure and a significant amount of discomfort that may not be taken very well by the children. In addition, the vibration and noise of the drill could be unpleasant to young ears, thereby lasers can prove a better tool as they do overcome all these fears of drill dentistry.[3] Additional benefits must far supersede the costs and investments when it comes to completing the laser requirements of any practice.

Patients' perception of laser dentistry

Generally, the treatment approach in paediatric dentistry is much different from adults. With Lasers bringing the additional benefits of no contact, no pressure, no drill, no anaesthesia and thereby a less negative perception of dentistry, higher success rates are likely to be seen. This is certainly because of an increased degree of satisfaction of the patients.

Marketing protocols help us to see a larger number of patients per day, but to have these patients accept the proposed treatments better, it is advisable to introduce to them tools that can truly help. As applicable in any field, an experience that exceeds the expectations will motivate the patients to keep appoint-

ments, accept recommended care and hence allow to build up positive clientele.

Laser indications in dentistry

Medicine began to integrate lasers in the mid-1970s for soft tissue procedures. The first laser specifically for dental use was a neodymium-doped yttrium aluminium garnet developed in 1987 and approved by the Food and Drug Administration in 1990.[4]

Benefits

- Less thermal necrosis of adjacent tissues is produced with lasers than with electrosurgical instruments.[5,6]
- Haemostasis can be obtained without the need for sutures in most cases.[7,8]
- Little or no local anaesthesia is required for most soft tissue treatments.[9–13]
- Reduced operator chair time has been observed when soft tissue procedures have been completed using lasers.
- Lasers feature decontaminating and bactericidal properties on tissues, requiring less prescriptions of antibiotics post operatively.[9,10]
- Lasers provide relief from pain and inflammation associated with aphthous ulcers and herpetic lesions without pharmacological intervention.[13]
- Erbium lasers can remove caries effectively with minimal involvement of the surrounding tooth structure because caries-affected tissue has a higher water content than healthy tissue.[5,7]
- As erbium lasers have no direct contact with hard tissue, the vibratory effects of conventional high speed handpieces are eliminated, allowing tooth preparations to be comfortable. As a consequence, anxiety in both children and adolescents is reduced.[9,11,14,15]

Lasers and profits in dentistry

Lasers allow the dental practice to balance well between business and dentistry. Offices that incorporate lasers in their practice have a unique psychological and promotional advantage over those who fail short to offer such services. Lasers are definitely the foundation of creating a referral-based practice.[16]

Benefits that add to the practice are always important, but how actually does one convince oneself to accept the resulting expenses for the practice. Usually, lasers are considered high investments and any high investment must prove reasonable enough to be accommodated in the practice. Return on investments with lasers can be easily pre-calculated. In general, laser treatments can cost 35 to 40 per cent more than the usual appliance, this calculation done for a return period of two to three years can yield on the investment.

	Laser Filling	Conventional Filling
One Surface	785	577
Two Surface	895	706
Three Surface	976	784
More than three surface	1082	847

Table 1

Table 1: Number of patients treated with laser vs. conventional approach.

Mathematics in pedonomics

The introduction of lasers into the practice should be made in an orderly and precalculated manner. Proper financial planning will help ensure the successful introduction of laser and help to yield its benefits better. Calculation of economics used in paediatric dentistry and thus making decisions in favour of economic benefits to the practice are the basis of pedonomics. The concept of pedonomics and the time-economics model are based upon the profitability per unit of chair time which is the most important factor in determining the financial future of the practice. Pedonomics work on the presumption that the profit matters, not the income.[16]

Laser costs

Cost is the primary determinant in any acquisition. In the most common manner, it is defined as the amount or equivalent paid or charged for something. It is termed as price in the economic language. Another important factor here is the opportunity cost. It is the added cost of using resources (as for production or speculative investment) forms the difference between the actual value resulting of using this opportunity and that of its alternative.

Opportunity costs is a major determinant as it describes the following:

1. Cost of the acquisition of a laser.
2. Costs incurred when not having the laser, which include: loss of income due to loss of high-end, cutting edge dentistry, loss of referrals.

The final decision to purchase is worked out after looking at both financial and the opportunity costs.[16]

Laser as a profit centre

There are many ways that can help us calculate the profits based on Laser procedures. In any private practice, time is money. This can be best determined on the basis of the average hourly income. There should be a certain specific amount that needs to be earned per hour that can keep the practice flourishing. Apart from this basic income, any additional ability to perform the procedure more efficiently means extra income. The average amount of one hour chair time should be able to yield approximately 500–750 US Dollars. This is not the fixed amount but an

Table 2: Cost comparison in UAE Dirhams between laser and conventional treatment.

Other procedures		
1	**Laser Cosmodent**	**Cosmodent**
	2250	1800
2	**Laser Frenectomy**	**Frenectomy**
	3100	2500
3	**Laser Sealant**	**Sealant**
	550	450
4	**Laser Pulpectomy**	**Pulpectomy**
	2100	1850

Table 2

approximate average that can keep the practice on profitable ends.

The procedures that can be effectively and efficiently performed by using laser in the paediatric dental office are:

1. Restorative laser dentistry
2. Laser-assisted endodontics
3. Frenectomy
4. Sealants
5. Minor surgical procedures
6. Tooth desensitisation
7. Lingual fraenum removal
8. Exposure of unerupted teeth
9. Laser tooth whitening
10. Treatment of orthodontic or drug-induced hypertrophy.

Return on Investment[16]

Once the laser is bought, pedonomics suggests that there should be a fair return on the investment made. Just to break even, the income generated by laser must include covering the price of the laser, maintenance, supplies as well as an additional amount to cover the income lost from the money used to purchase the equipment and not otherwise generating its own income. The profit that exceeds the break-even point is called the return on investment (ROI).

Some of the items that should be included in ROI would entail the profit from the following:

1. Novelty of procedures with lasers.
2. Reduced out-referrals, caused by the new laser procedures.
3. In-referrals due to the uniqueness of laser-assisted paediatric dentistry.

Tracking

To actually calculate the accurate financial return of introducing the laser to the practice, the income derived from laser must be monitored over time. A new terminology used in pedonomics is KPIs which stands for key performance indicators.

These are the factors that are used in evaluating the success of the profit centre as follows:

1. Laser-assisted procedures.
2. In-referrals for laser procedures.
3. New patients that come asking for laser.

If KPIs seem to increase or even remain at a good level, this indicates that break-even and the much awaited ROI will not be far off.

Unique selling preposition

The USP is the unique cutting edge of any practice. When it comes to paediatric dentistry, lasers are indeed a unique selling preposition due to their contemporary benefits. In the field of marketing and management, USP is defined as the factor or consideration presented by a seller as the reason that the product or service is different from and better than that of the competition. The USP of lasers are as follows:

1. Non-surgical minor procedures.
2. No drill.
3. No anaesthesia.
4. No pressure on or contact with the tooth.
5. Easier healing.
6. Less need of analgesics and antibiotics.

Six Sigma approach of pedonomics

Six Sigma is defined as the set of techniques and tools for process improvement. It was introduced by Engineer Will Smith in 1986 while working at Motorola. Jack Welch centralised this as a business strategy in 1995 at General Motors. The main implication of the Six Sigma approach in any industry is to be flawless and error-free. It uses a set of quality-management methods, mainly empirical or statistical, and creates a spatial infrastructure of people within the organisation that are aware of this method.

A Six Sigma process is one in which 99.99966 % of all opportunities to produce some feature of a part are statistically expected to be free of defects (3.4 defective features per million opportunities). When applied to medical or healthcare systems, the most important dimensions of the quality of the medical act are:

- Safety
- Professional competence
- Acceptability
- Efficacy and Relevance
- Efficiency 17 ref.
- Accessibility
- Continuity
- Interpersonal relations
- The patient's satisfaction
- Patient compliance.

Lasers as the Six Sigma in pedonomics

To make the delivery of the treatment best accepted by the family, it must be fit to comply with the level of patient acceptance. The average amount that can be generated by laser treatment quite exceeds the amount generated by conventional treatments.

The approximate amounts ranging in our practice which runs its costs parallel to the costs in the United States can be seen from table 1 and 2 and the following numbers:

- The average amount spent on purchasing as laser: 350,000 AED.
- Equated monthly instalments calculated with interest: the purchase of laser was made with complete down payment.
- Average cost per month over three years period: 10,000 AED.
- Average increase in treatments with laser vs conventional approach: about 200 per type of treatment:
- Fillings: approximately: 300 more with laser than Conventional way; average 45 per month.
- Pulpectomy: only lasers. Average 30 per month.
- Laser sealants: average 30 per month.
- Laser frenectomy: 2 per month.
- Laser pulpotomy: 15 per month.

Based on the above numbers, the approximate profit earned on laser vs. conventional approach:

- Fillings: 50 x 300: 15,000 AED.
- Pulpectomy: 30 x 300: 9,000 AED.
- Frenctomy: 600 AED.
- Seals: 30 x 200: 6,000 AED.
- Sealants: 20 x 300: 6,000 AED.
- Pulpotomy: 15 x 300: 4,500 AED.

Based on the above figures, the average amount gained from laser approach of treatment: 41,000 AED.

- Net profit: 41,000–10,000 (monthly investment on laser over three years period)
  = 31, 000 AED per month.

Break even was tentatively achieved at the end of 14 months. Profit started roughly after this period.

Conclusion

The Six Sigma approach with lasers teaches us to apply the zero-defects principal. This degree of excellence is not just in a word, but there is a realistic possibility of making it happen. It is an approach that can actually accelerate the rhythm of development and of the distribution of new ideas within an organisation. Laser is a tool that helps in the application of the Six Sigma principle in the dental office. In conclusion, it is statistically proven that laser with all its attributes is quite efficient in bringing "more dentistry" to a dental office._

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Kurz & bündig

Im vorliegenden Artikel befasst sich die Autorin mit den wirtschaftlichen Aspekten der Kinderzahnheilkunde innerhalb der zahnmedizinischen Praxis. Mit dem Begriff „Pedonomics", einer Kopplung aus pediatric dentistry (AE für Kinderzahnheilkunde) und economics (Wirtschaft) fasst sie dabei die wesentlichen Inhalte zusammen und erläutert diese im Verlauf des Beitrags ausführlich mit speziellem Hinblick auf die Laserzahnmedizin. Dabei sieht sie die steigende Nachfrage nach Laserzahnbehandlungen in der Kinderzahnheilkunde u. a. durch den zunehmenden Fokus auf moderne Technologien in allen Bereichen der Medizin begründet, aber auch durch die Ansprüche von besonders fürsorglichen Eltern (besonders die sogenannten Helikopter- oder Dronen-Eltern) an eine umfassende und fortschrittliche Dentalbehandlung ihres Kindes. Auch der kindlichen Perspektive werde die Lasertherapie gerecht, denn sie reduziert Schmerz und Beschwerden während der Behandlung und kann damit effektiv der Angst vor dem Zahnarzt entgegenwirken. Als Folge sieht die Autorin steigende Überweisungszahlen und eine generell höhere Akzeptanz der Therapie. Nach einer ausführlichen Kosten-Nutzen-Analyse des Lasereinsatzes in der Kinderzahnmedizin, bei der die Autorin u. a. die Aspekte der Kapitalrendite, Kennzahlen, Alleinstellungsmerkmal und die Methoden der Six Sigma-Analyse berücksichtigt, kommt sie zu folgendem Fazit: Die Laserzahnmedizin könne ein Schlüsselmoment für die Anwendung des Six Sigma-Verfahrens zur positiven Entwicklung einer Zahnarztpraxis darstellen. Dabei sei es statistisch erwiesen, dass Laseranwendungen ein effizientes Mittel seien, um den Umsatz einer zahnmedizinischen und speziell kinderzahnmedizinischen Praxis zu erhöhen.

Literature