OUTSOURCING IN ORTHODONTICS

Dr. Navdeep Dhillon*, Dr. Sudhir Munjal, Dr. Satnam Singh, Dr. Amanpreet S. Naat, Dr. Harmeet Singh and Dr. Akshita Mahajan

Dasmesh Institute of Research and Dental Sciences Faridkot.

---

*Corresponding Author: Dr. Navdeep Dhillon

Dasmesh Institute of Research and Dental Sciences Faridkot.

ABSTRACT

Outsourcing is the act of transferring some of an organization's recurring internal activities and decision rights to outside providers, as set forth in a contract. Outsourcing as an idea is not novice; it has been there for over a thousand years now, the only difference being that it's gaining lot more popularity since a decade. Outsourcing basically means asking a third-party vendor to work for you on a contractual basis. Companies outsource primarily to cut costs. But today, it is not only about cutting cost but also about reaping the benefits of strategic outsourcing such as accessing skilled expertise, flexible staffing, increasing efficiency, reducing turn around time and eventually generating more profit.[36]

INTRODUCTION

Outsourcing as we know it today is merely a progression of an idea that has existed since early days of trade. As companies grow in size and operations, it becomes increasingly clear that their focus has to be redirected to their core activities while the non-core functions can be 'sent out' or 'outsourced' to vendors specialized in that particular function. The most common example of such outsourcing in dentistry is the fabrication of crowns, bridges and other dental prosthesis by dental clinics to dental laboratories. Now the same forms of services have extended to software, dental transcription, 3D printing, imaging technologies and other clinical research aspects.[36]

Strategic reasons for outsourcing.[13]
1. Focus on core functions.
2. Accelerate migration to new technology.
3. Enhance risk management.
4. Lower infrastructure investments.
5. Access to world-class capabilities.

Tactical reasons for outsourcing.[13]
1. Control operating costs.
2. Improve operational performance.
3. One time applications.

Outsourcing in Diagnostic Techniques
Recent advances in diagnostic aids address a special aspect of orthodontic diagnosis and treatment planning. Successful orthodontic treatment is dependent on the disciplined approach from record taking to diagnosis and careful monitoring of the progress in treatment.[20] The practice of orthodontics has been transformed by the computer revolution of the 1990's. Digital orthodontics has created a paradigm shift in practice management.

The various diagnostic aids used are
i)   CBCT
ii) Digital Cephalometry
iii) Various automated ceph softwares
iv) Digital study models
v)   Ultrasonography

1) Cone Beam Computed Tomography[20]
The development of Computed Tomography (CT) and Three-Dimensional (3D) reconstruction in the 1970's brought about a revolution in diagnostic radiology. CBCT can exactly record and represent the size and shape of the object. Three-dimensional visualization with proper computer software and environment can be used for diagnosis, surgical planning, and simulation of operation.

Clinical Applications in Orthodontics
• Impacted teeth and oral abnormalities
• Airway analysis
• Assessment of alveolar bone height and volume
• TMJ morphology
• Lateral and Frontal Cephalogram views
• Skeletal views
• Facial analysis
• 3D review of dentition

II) Digital Cephalometry

The paradigm shift is occurring in orthodontics from the widely accepted film based to digital cephalometry. Digital radiography is a method of reproducing a radiographic image using a technology sensor of solid-state, which are broken into electronic pieces, presented and stored as an image using a computer. There are two advanced technologies that create digital images without an analog precursor.[7]

1. Direct digital images
2. Semi direct digital images.

The most commonly used analysis operation in digital radiography is measurement. Various measurement tools included are single/multiple linear and angular measurements. Automatic land marking is the first and last step in the development of a completely automatic cephalometric analysis. A plethora of softwares is available for automatic image analysis like Vistadent, Dolphin, Quick ceph, Dentofacial Planner, Vixwin software etc.

III) Digital Study Models

Study models have long been an essential part of the orthodontic process. They have traditionally been cast out of either plaster or stone. These study models have a number of drawbacks in terms of storage and retrieval, diagnostic versatility, transferability, durability. The digital study models overcome most of the drawbacks of plaster study models.

There are two basic methods of producing digital study models

Destructive imaging and Non-destructive imaging. Two successful companies in producing high-quality 3-D models are
• Orthocad
• Geodigm

Procedure includes making high-Quality Impressions, Scanning of impressions and manipulation of virtual models. Measurements are made with a virtual caliper and automatically stored.

IV) Ultrasonography[20]

Diagnostic Ultrasonography, employs vibratory frequency in the range of 1 to 20 MHz. Scanners used for sonography generate electrical impulses from high-frequency sound waves by a transducer.

Applications in orthodontics

1. Comparison of Tongue Functions between Mature and Tongue-Thrust Swallowing.
2. Imaging of condyle.
3. Examination of muscles of mastication

The above mentioned diagnostic techniques require expensive machines and armamentarium; trained personnels to operate them which are generally beyond the capacity of Orthodontists practicing in their private set ups. So to avail the benefits of these diagnostic aids; these are outsourced to make them economically viable and additionally it also saves time.

2) Outsourcing Removable Appliances

Dental appliances make up a diverse group of devices ranging from ceramic orthodontic brackets to soft mouth guards. Some are custom-fitted devices and some are supplied generically to fit a variety of patients. A distinct subgroup of custom-fitted appliances consists of appliances that are removable from the mouth. They are produced in commercial dental laboratories.[26]

Various removable appliances that are used in orthodontic practice include
i) Removable appliances for active tooth movement.
ii) Myofunctional appliances*:*
iii) Retainers
iv) Snoring / Sleep apnoea appliances
v) Splints/ Deprogrammers
vi) Habit breaking appliances
vii) Space maintainers/ Regainers
viii) Appliances for arch expansion
ix) Appliances to avoid sports injury

Fabrication of these appliances can be done manually or digitally in which the Appliance design is performed in a computer, and computer-controlled machines are used to mill the body of the appliance. The advantages of digital manufacturing of removable appliances over manual fabrication include.[26]
i) Improved uniformity of design and final shape.
ii) Reduced trimming time.
iii) Integration with digital diagnostic information to enhance design,and ability to provide digitally-based design input from the prescribing doctor.
iv) Appliance fabrication is speedy.

3) Customised Brackets and Archwires for Fixed Labial Appliances

Current bracket systems are based on an average tooth shape, but only a small percentage of patients have average teeth. The inter and intra individual variation is the reason why Orthodontists must adapt their treatment to the patient's specific tooth shape and morphology in order to achieve ideal alignment, esthetics, and occlusion.[12]

Customized systems allow orthodontists to initiate treatment with the final goal in mind, and streamline mechanics towards a pre established result. New three-dimensional technology in the design and production process allows manufacturers to produce brackets, archwires or both individualized to each patient.[12] The various techniques used in manufacturing customised brackets and archwires
(i) Insignia
(ii) Suresmile

Insignia

Insignia software incorporates the clinician's treatment plan into a virtual 3-dimensional model of each patient's ideal occlusion and delivers a complete custom solution: patient-specific brackets, precision (computer-assisted) bracket placement, and custom wires to eliminate time consuming adjustments in all phases of treatment.[48]

Sure Smile

Sure Smile (Orametrix, Inc., Richardson, TX, USA) uses customized arch wires with conventional brackets to compensate for individual tooth anatomy among patients and errors in bracket placement. As opposed to other systems, Sure Smile customization takes place in the finishing stages of orthodontic treatment.[12]

4) Customised Brackets and Archwires for Fixed Lingual Appliances

Lingual bracket system has evolved from first‑generation Ormco lingual brackets to computer‑ aided design/ computer‑aided manufacturing (CAD/ CAM) based completely customized lingual appliance.

Indirect bonding and laboratory setup[45]

The morphological variations of lingual dental surfaces limit the direct bonding of brackets on lingual surface accurately and precisely. Hence, indirect bonding technique is pivotal for success in lingual orthodontics. There are different laboratory techniques which have been developed for indirect positioning and bonding of lingual brackets.

Laboratory setup for indirect bonding of lingual appliance can be divided into two categories
i) Manual setup which uses patient's dental models and includes various methods (BEST, CLASS, and HIRO, etc.)

ii) Digital lingual setup (Orapix, WIN, HARMONY, Incognito™ and Lingual Matrix, and iLingual III D,) individualized for each patient, made by using patients scanned model or three‑dimensional (3D) image and brackets are designed and manufactured by CAD/CAM technology.[45]

5) Robots in Orthodontics

High-powered computers and advanced robotics continue to move forward in the field of orthodontics. Applications of robots in orthodontics:
i) Sure smile archwire bending robot.[46]
ii) Lingual archwire manufacturing and design aid (lamda).[9]
iii) Archwire bending robot based on motoman up6.[46]

The archwire bending robot is composed of
a) Pc
b) Motoman up
c) Archwire bending actuator.
d) Cartesian type archwire bending robot.

6) Outsourcing Clear Aligners

Orthodontic treatment with clear aligners is a quickly growing sector of orthodontic treatment. Increase in awareness for esthetics and the increased demand of orthodontic treatment from adults has fueled the demand for a more esthetic orthodontic treatment technique. The removable orthodontic aligner technique has now become a contemporary treatment alternative that the Orthodontists may offer their patients since the development of combined computer technology and custom manufacturing process.

Clear aligners treatment falls into two categories.
i) The first category consist of those thermoformed appliances known as Essix Retainers that are fabricated by making adjustments to teeth positions on plaster or stone models and fabricating one or more aligners to correct a minor malocclusion. These are often fabricated in orthodontic office or sometimes sent to commercial laboratories.
ii) The second category are the clear aligners fabricated using a series of computer generated custom plastic aligner s to gradually guide the teeth into proper alignment.

7) Outsourcing In Dental Billing And Appointment Scheduling

It is quite challenging for orthodontists to offer the best dental care services and simultaneously handle all matters pertaining to dental billing, insurances and reimbursements. As orthodontists try to provide their patients with better service, one area that they should focus is their scheduling. The influx of calls and rescheduling can become frantic if they don't have a reliable team and system in place to manage these calls.

Outsourcing dental billing, insurances, reimbursements and appointment scheduling is a good investment. In doing so one can concentrate on the core function and make sure that all dental billings, reimbursements and appointment scheduling are done efficiently and effectively at reduced operational cost.

8) Outsourcing Marketing

The alarming increase in primary care dentists (PCDs) providing orthodontic care to their patients, combined with the recent emergence of mail order do-it-yourself (DIY) braces, has resulted in a paradigm shift in advertising by orthodontic specialists .Orthodontists are no longer choosing to rely solely on referrals from neighboring PCDs, but rather have adopted a strategy to market and educate prospective patients directly.[7]

Marketing is the need of today, so an orthodontist should hire competitive companies or individuals to manage marketing without burdening his already available staff.

DISCUSSION

The health sector including the dentistry is no exception to this. Today, orthodontists are turning to outsourcing

for various diagnostic techniques, manufacturing various removable orthodontic appliances ,for fabrication of customised brackets and arch wires in fixed labial and lingual orthodontic, trays for indirect bonding, clear aligners etc. The orthodontists are also outsourcing dental billing, patient follow up appointments and marketing services.

Outsourcing benefits the orthodontists by allowing them to focus on their "core competencies" i.e quality patient care. In this way, the orthodontists can shift their energy away from peripheral activities that lie outside of their true area of expertise and instead concentrate more energy on what they do best in order to differentiate themselves from their competitors.

CONCLUSION

Rapid advancement in every field makes it impossible for every organization to develop and sustain best in the world expertise in every facet of its operation. No organization including the health sector and dentistry can stay competitive in today's rapidly changing global economy by relying solely on its own resources. Through outsourcing, organizations solve this dilemma by focusing their internal resources on the core activities that provide them a unique competitive advantage. Thus outsourcing is a necessary response to today's hyper competitive environment.