

Benex extraction kitMakan Zaker¹Maia Jikia²

The University of Georgia, School of Health Sciences

¹Student, Dental program in English²Supervisor, MD, PhD, Professor**Summary:**

Due to the history of dentistry dentists came a cross so many ups and downs regard the methods of approach for dental treatment. With evolving of technology dentists are trying to solve these problems step by step. For extracting a teeth ,either its fractured or not ,or impacted or not impacted ,dentists are used many different methods such as closed and open (surgical) extraction , many armamentarium used for these procedures to have the best outcome and result .There are some complications ,that make extraction hard , in some cases even post-operation problems may occur .Benex system (extraction kit)new method of tooth extraction with less error and less future complications ,it is way easier than common methods of extraction and more efficient surgically , medically and physically due to its minimal invasive extraction technique.

Key word: *Benex extraction kit, Tooth extraction, minimally invasive procedures.*

Introduction:

There are many indications for tooth to be extracted, it can be trauma, fracture, excessive tooth wear, infection periapical tissue, caries etc. Dentists have to asses all available options and procedures to find right approach for this complication. Generally, dentists must avoid extraction as much as they can because natural structure of the teeth and it place in the oral cavity is flawless, so no restorative method and implantation can be as good as the natural teeth but at some point the problem is too deep and the extraction is the only solution for doctor. This process needs careful planning and follow up. Dentists use many material and instruments for the extraction: 1. Scalpel: dentists use this to cut through tissues, composed of handle and disposable sterile sharp blade.2. Periosteal elevators: can be single or double-ended. It can be used to reflect soft tissue. Most commonly used when teeth are to be extracted and the soft tissue attachment around the tooth must be released. This instrument is relatively small and delicate and can be used to loosen the soft tissue via gingival sulcus.3. Tissue forceps: delicate forceps with small teeth which can be used to gently hold tissue and thereby stabilize it. 4.chisel and mallet: for removing the bone and section them, but now days dentists use electrical cutting rotary material for better and faster results .5. Needle holder and suturing material: dentists use needle holder to hold needle for suturing the open wound (suture material can be resorbing able and non-resorb able material, Polly filament & monofilament)6. Suction: (injector) for suction of blood and saliva out of the oral cavity during procedures.7. Dental elevators: used to luxate teeth from surrounding bone to make the tooth mobile from the ligaments that hold the tooth into the socket for the purpose of minimize breaking of the teeth and root, facilitates removal of broken tooth & expand alveolar bone. These instruments are crucial and important for tooth extraction.

Dental forceps are the main instrument for removing the tooth out of the socket and alveolar bone. By surgical forceps dentist have to apply 5 major motions according of tooth topography and anatomy: motion 1: apical force, motion 2: buccal force, motion 3: lingual force, motion 4: Rotational force, motion 5: traction force. Dentists use mixture of this motions to have a tooth extraction without any complication. For example, Maxillary buccal bone is thinner and palatal bone is thicker, that's why maxillary teeth are removed by stronger buccal forces and less palatal forces.

Methods of extraction:

Generally, extraction can be divided on closed and open extraction. Due to the anatomy and topography of the tooth we can decide which method should be used: closed or open extraction.

Closed (simple) extraction basic method of extraction without any flaps or removing any bones. It is the most frequently used technique and is given primary consideration for almost every extraction. Five major step are used for closed extraction: step 1: Loosening of soft tissue attachment from the tooth, step 2: Luxation of tile tooth with a dental elevator, step 3: Adaptation of the forceps to the tooth, step 4: Luxation-of the tooth with the forceps, step 5: Removal of tooth from the socket. Open extraction is used when there is more complication about the state of the teeth: root fracture, severe trauma and etc.

Whatever technique is chosen, the three fundamental requirements for a good extraction remain the same: (1) adequate access and visualization of the field of surgery, (2) an unimpeded pathway for the removal of the tooth, and (3) Used of controlled force to luxate and remove the tooth. For the tooth to be removed from the bony socket, it is necessary to expand the alveolar bony walls to allow the tooth root an unimpeded pathway, and it is necessary to tear the periodontal ligament Fibers that hold the tooth in the bony socket. The use of elevators and forceps as levers and wedges with steadily increasing force can accomplish these two objectives.

These steps are crucial for the extraction and should be done with utmost concentration for a perfect extraction. After all these steps its need to close the wound and clean the area around to prevent infection and have better healing process. Preparing for Wound Closure: 1. Use bone file to smooth sharp edges of bone 2. Remove all particulate bone chips and debris from the wound 3. Irrigate thoroughly under the soft tissue flap, inspect 4. Check for adequate hemostasis 5. If the flap was well designed and not traumatized during the extractions, it will fit in its original position.

Benex extraction kit

It discussed the common methods for extraction closed and open. These methods are accurate and efficient and all these years have proven themselves that they are to be trusted and had many good results due these ages of dentistry but there is always a place for progress in any studies. Advancement of technology can be a good thing for future, it makes our life and our profession easier and smoother.

By introducing Benex to the world dentists can break through many factors. Common methods of surgery, extraction will take so much time and instrumentation, for choosing material like forceps and elevators specific for each teeth, what motion dentists have to use or having so much stress to not fracturing the root or the teeth itself in to the socket, due to the post operation complications, wound healing planning and therapy. Benex system will minimize these complications to a desirable state. This method can be a next step to the new era of dentistry, Specially in surgery field due to its tissue conserving extraction method. This system designed by a Swiss doctor named Benno Syfrig past these years .in the modern age of dentistry, implantation after extraction is very common and important, due to that reserving soft tissues and bone structure play a very important role for a successful implantation after any extraction. Benex system guarantees a gentle and simple extraction with minimum complication and structural problems due to its longitudinal extraction. In all extraction done, preservation of alveolar ridge is crucial factor to the whole operation (takes 3-4 month after extraction to see the full result). Studies on patient with Benex either private practice or academic showed significant result on the ridge, better healing without any post-operation complications.

This extraction kit consists of different parts that each have individual responsibilities that they combine with each other and create this system. Basically this system consists of 5 major part and some minors (optional): 1. Diamond coated drills (for screws), 2. Screw, 3. Pull rope, 4. Support disc, 5. Benex extractor

Diamond coated drill: Its first step for the extraction to drill in to the tooth cavity for placing the screws in the cavity.

Screw: These screws will have placed in the cavity to pull the tooth out of the cavity. Their shape designed for the purpose of pulling out, there is gap in the upper part of the screw that has an adequate gap to get hooked with the special hook that appears on the pull rope.

Pull rope: It is a wire that placed in the extractor from one side it gets locked in the extractor kit and the other side into the screws for the extraction.

Support disc: Its head part of the extractor that get placed on the occlusal part of the teeth on oral cavity for better pull core.

Benex extractor: The main part of the system that pulls the tooth outta socket with vertical movement using newton's law of motion.

Physics: This system like so many natural and mechanical factors of life, relates to newton's three law of motion: 1. Every object in a state of uniform motion will remain in that state of motion unless an external force acts on it..2. Force equals mass times acceleration [$f(t)=m a(t)$],3. For every action there is an equal and opposite reaction. Due to these laws of physics our system operates to extract the teeth vertically out of the socket.

Mass: Mass is an intrinsic property of matter. From Newton's second law, $f(t)=m a(t)$, we have that the amount of force required to accelerate an object, by a given amount, is proportional to its mass. Thus, the mass of an object quanti-

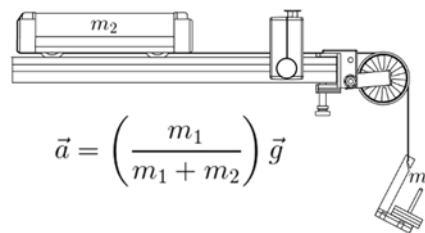
fies its inertia--its resistance to a change in velocity. We can measure the mass of an object by measuring the gravitational force between it and another known mass, as described in the next section. This is a special case of measuring its acceleration in response to a known force. Whatever the force (f), the mass (m) is given by (f) divided by the resulting acceleration (a), again by Newton's second law $f=ma$.

Gravitational Force: We are all familiar with the force of gravity. It is a fundamental observed property of our universe that any two masses m_1 and m_2 experience an attracting force f given by the formula
$$f(t) = G \frac{m_1 m_2}{r^2(t)}$$

Where $r(t)$ is the distance between the centroids of the masses m_1 and m_2 at time t , and G is the gravitation constant..

Benex system uses these equations and rules in physical aspect to make the system works.

It uses gravitational pull with adequate force to pull the mass (the teeth in this system) out of its place.



the teeth & such, we follow these steps: 1. Dentists make anesthesia to make sure patient feels no pain through the operation, successful anesthesia is a crucial factor for every operation. 2. Dentists use periodontal probes to cut the periodontal fibers from the teeth structure 3. use of elevators (slim / twisters) to luxate the teeth in the socket about 30 second without using transversal movement in case multi-rooted teeth, in these case roots will divided and extracted separately 4. With the diamond coated drill, we drill in to the tooth cavity .axially into the root fragment (approximately 7mm into the hard tissue, more drilling will not be necessary). Movement of drill should be inward and outward in vertical matter. 5.

After drilling, Dentists apply the screws into the drilling holes, drive the screw into the holes with screw driver guide. Make sure that screws are intact in the cavity with adequate support (not be loose) because we need a strong pull so screws should be in perfect position. 6. The shape of the screws designed with a gap that it get hooked in with pull rope. So we intact the pull rope in to the screws. 7. This the part that Dentists use Benex extractor, to pull the tooth out of the socket. Extractor is positioned on the adjacent crown, and the pull rope is already hooked in from one side and in other side the rope is placed in to the extractor (extraction slide). Dentists should make sure that the rope is not hang out, and then we start to rotate the hand screw (part of the extractor which with rotating motion will pull the rope). 8. With the hand screw motion, we drive out the

tooth out of the socket which that already luxate and periodontal fibers were loosen. 9. So at final step we drive the full tooth out of the socket with the extractor fully. When all these steps are done, we suture the extraction site and clean the wound.

Benex system can be used for so many purposes. Especially when the head of the teeth (crown) are gone and Its hard to extract teeth without breaking and damaging the structure and soft tissues around the teeth. It can also be used for extrusion and intrusion with simple drilling we can bring the tooth in its natural location and follow up with post and core method for the restorative measurement.

Trans alveolar extractions: This method of extraction comprises the dissection of tooth or root from its bony attachment. It often called the open or surgical method. With Benex system we can extract them with simple drilling and without flaps and damaging area.

Discussion:

I compare the all the methods, open & closed extraction (trans alveolar) I talked about the procedures and armamentarium, choosing right approach and methods. if u read the pervious parts you realize with a simple comparison, you'll understand that there is significant difference between time, material & complication in these methods with each other. Benex will eliminate so many of our routine problems in extraction and bring a perfect satisfaction to the patient due to its simple nature but common methods of extraction's can cause damages to our oral cavity, may cause root fracture, excessive removal of the bones and sometimes post-operation problems.

Conclusion:

We try to have the best outcome for extraction, so we use our methods wisely considering the tooth status, we can either use open or closed extraction due to the severity of the tooth condition. these old methods have their own steps that take a long path to achieve, but with Benex we can make the procedure simpler and without any time consuming methods and also reducing structural damage to the tooth cavity.

References:

1. Hupp, James R., Contemporary Oral and Maxillofacial Surgery, Pg.65., 2014, Sixth Edition.
2. Stephen Rosenstiel & Martin Land, Authors: Junhei Fujimoto Contemporary Fixed Prosthodontics, chapter 13., 4th Edition, Editors: