

VarioSurg

Version 3

Oral Surgery and Implantology



...and all becomes possible

NSK

DVD Menu

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Foreword

By Dr Benoit Philippe
Oral and Maxillofacial
Surgery

All surgeons who work on bone search for the ideal of efficient osseous interventions without risk to the adjoining soft tissues and organs.

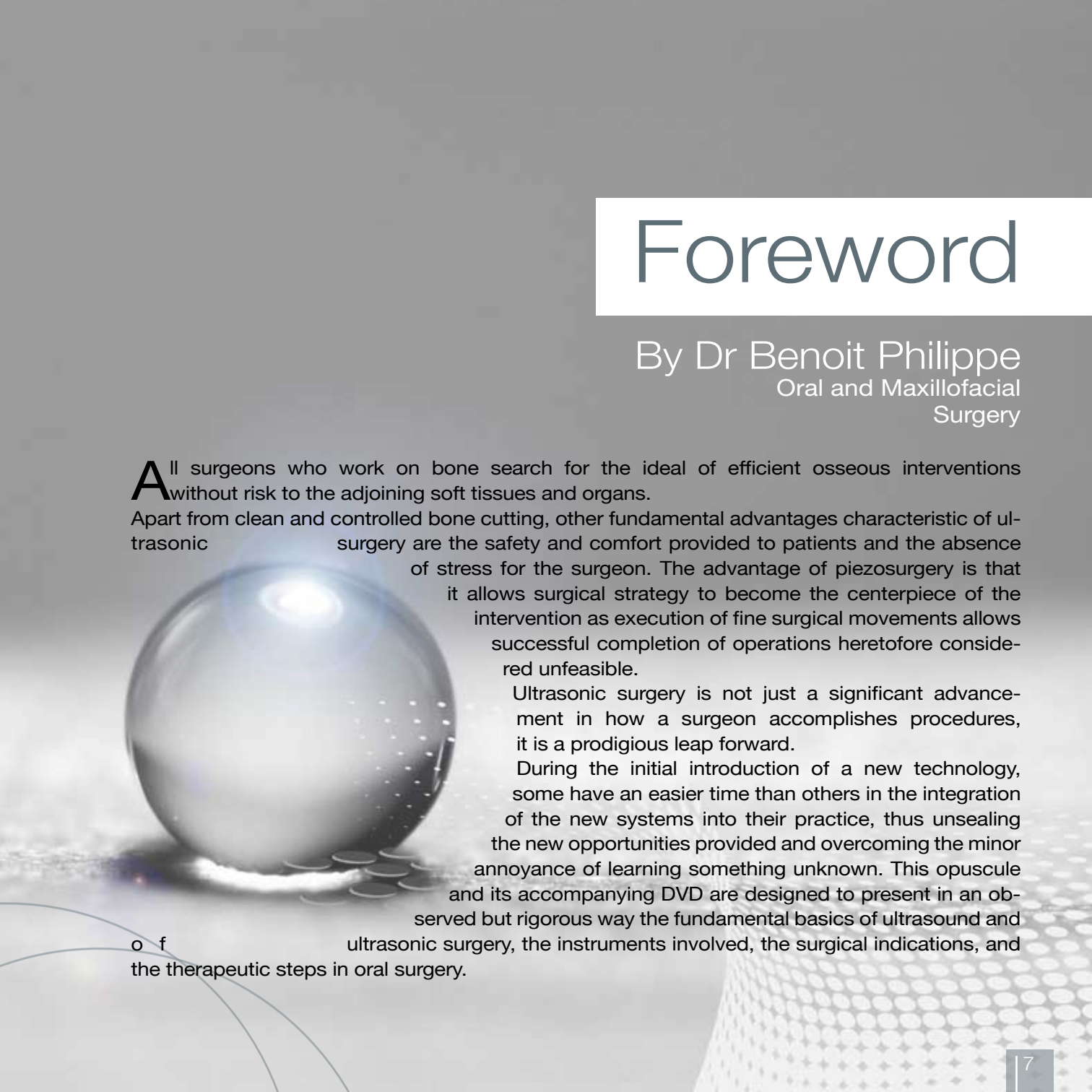
Apart from clean and controlled bone cutting, other fundamental advantages characteristic of ultrasonic surgery are the safety and comfort provided to patients and the absence

of stress for the surgeon. The advantage of piezosurgery is that it allows surgical strategy to become the centerpiece of the intervention as execution of fine surgical movements allows successful completion of operations heretofore considered unfeasible.

Ultrasonic surgery is not just a significant advancement in how a surgeon accomplishes procedures, it is a prodigious leap forward.

During the initial introduction of a new technology, some have an easier time than others in the integration of the new systems into their practice, thus unsealing the new opportunities provided and overcoming the minor annoyance of learning something unknown. This opuscle and its accompanying DVD are designed to present in an observed but rigorous way the fundamental basics of ultrasound and

of ultrasonic surgery, the instruments involved, the surgical indications, and the therapeutic steps in oral surgery.



How VarioSurg works

The strong points



NSK VarioSurg
efficiency comfort

safety **precision**



Patient comfort is a
basic tenet of quality

Predictability of results and low rates of complication are fundamental to all treatments and surgical interventions that are performed today.

the Improve post-operative recovery of your patients

The strong points

1. Efficiency

- Only full osteotomies are performed without partial cuts.
- Shortening of the duration of the operation by avoiding the need to spend additional time to protect critical anatomical structures.
- Reduction in the need of a large periosteal elevation in order to position protective instruments.
- Lightweight and balanced handpiece allows fine movements; the surgeon is able to use the handpiece in a relaxed manner as if holding a paintbrush.
- The surgeon can work ambidextrously and therefore is able to access difficult to reach or difficult to visualize areas.
- Reduced operator stress allows for optimization of results.

2. Comfort

Patient Comfort

- Improved patient confidence because of the safety and gentleness of the bone osteotomies.
- Absence of the sensation of vibration from the surgical instrument as the tip is facilitated by microscopic movements.
- Simple post-operative recovery as there is no collateral damage to surrounding soft tissues.
- Increase in the number of interventions that can be performed under local anesthesia.

Surgeon Comfort

- Operating sites are clearly exposed by an integrated high performance lighting system exclusive to NSK.
- Excellent hemostasis within the operative field.

3. Precision

- Precise procedures thanks to the lack of parasitic movements transmitted from the handpiece to the surgeon.
- No undesirable torque or translation movements.
- Finesse of handpiece manipulation without overt muscle exertion.
- Absolute control of the instrument's tip due to a fast and progressive startup of the motor.

4. Safety

- Based on the «selectivity» principle: only skeletal tissues are cut, preserving the soft tissues, including nerves, sinus membranes, and vessels.

Basics

of Ultrasound Technology



General Principles



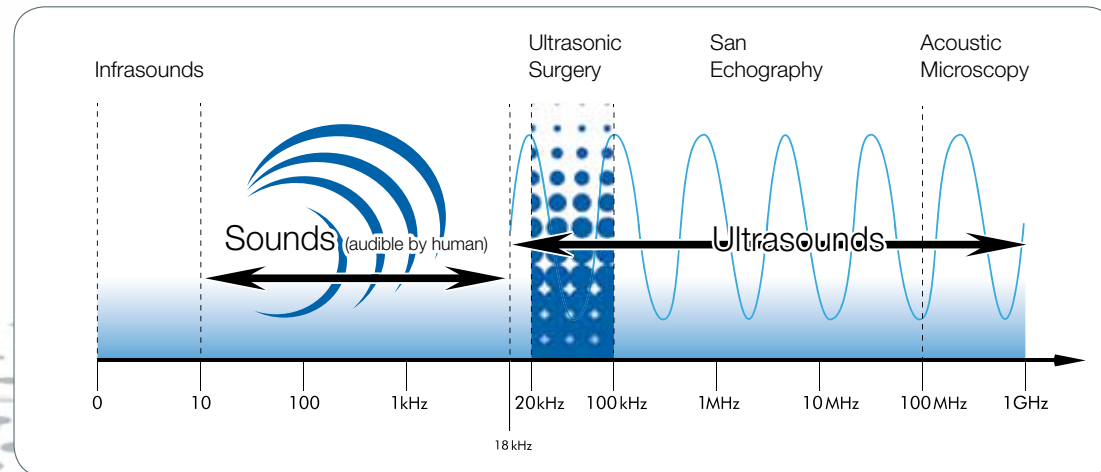
1. Ultrasound

The term ultrasound describes mechanical vibrations with an oscillatory frequency above the auditory limit of human beings, i.e. 18,000 oscillations per second (18KHz).

The frequencies used in ultrasonic surgery lies between 20KHz and 100KHz.

Due to the nature of their vibrations, ultrasound waves can only propagate in solid media (ceramics and metals in particular), liquids and gases ¹²

In contrast to their high frequency, ultrasound waves have low amplitude. This beneficial property allows for work of high precision.



2. Piezoelectricity

Some materials, particularly crystals and ceramics, generate an electric current when they are subjected to mechanical pressure (Greek «Piezin»). This is the «**Piezoelectric Effect.**»

Conversely, when these materials are subjected to an electric current, they deform. This is referred to as the «Inverse Piezoelectric Effect.»

This fundamental discovery came from the research of the Frenchmen Pierre and Jacques Curie in 1880 ¹

In the middle of the 20th Century, this discovery was applied to surgery on humans (neurosurgery, orthopedic surgery, followed by oral surgery) ^{6 11 7 8 16 17 18}

By applying electrical impulses to piezoceramics, microvibrations are created which can then be used in surgery on humans.



surgical
ultrasonic frequencies
20 et 100 KHz



3. Description of NSK technology

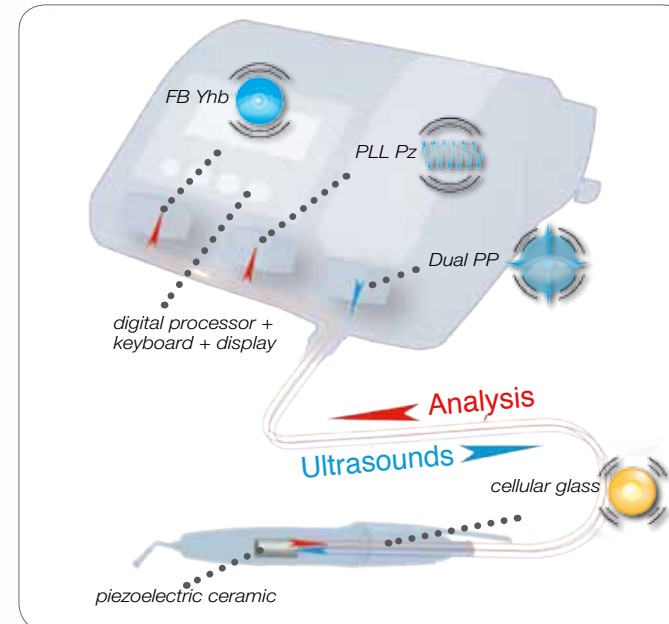
The NSK VarioSurg system is an innovative global concept in ultrasonic surgery. It is the result of a research and development program in ultrasonic osteotomy focused on the optimization of piezoelectric transducers and electronic control. The application of many patented new developments make the NSK VarioSurg system an exact extension of the surgeon's hand.

The handpiece is designed from very high performance ceramics and uses the reciprocity of the piezoelectric effect in an unequalled way. The handpiece of the NSK VarioSurg system performs two functions simultaneously:

- Generation of very high precision ultrasonic vibrations.
- Real time analysis of tissue reactions to the impacts of the tip and the forces applied through the surgeon's movements.

The ergonomics and finesse of the new handpiece allows for extreme ease of use. Its LED lighting technology emits a white light that provides for improved visibility under all circumstances thanks to a constant radiance.

The generator delivers electrical impulses to the handpiece converted into high frequency microscopic vibrations. In return, the generator receives information collected from the handpiece, which delivers a carefully adjusted force.



4. Control and safety devices

The FB Hyb device (Feed Back Hybrid)



is used to respond immediately to changes in tissue hardness and structures encountered by the tip. Its high performance is due to the skill of our NSK engineers. This is a specific device, which controls the movement of the instrument's working tip. It is designed from a hybrid principle combining the best of analog and digital technologies and is currently the fastest control system on the market (response time less than 0.04 milliseconds).

The PLL Pz (Phase Locked Loop) device



is specific to NSK's know-how and is an innovative frequency control (phase control) device providing real time locking of vibratory frequency and returns tactile sense to the surgeon's hand so that there is full control of the procedure.

The Dual PP device



delivers pure electrical signals to the «Piezoceramics» and controls the spatial movements of the tip through a double Push-Pull amplification system, which is unique to NSK technology.

Operating field lighting



Use of NSK Cellular Glass technology makes NSK VarioSurg the only ultrasonic system with integrated lighting. Effective and comfortable, it provides the surgeon with improved visual comfort and acuity and thus optimal safety during the intervention.

General Principles



5. Methods of action of the tip

Direct mechanical effect:

The tissues in contact with the tip are subject to a sequence of microscopic impacts at a very high frequency under intense acceleration (300,000 G).

These accelerations are proportionate to the square of the frequency.

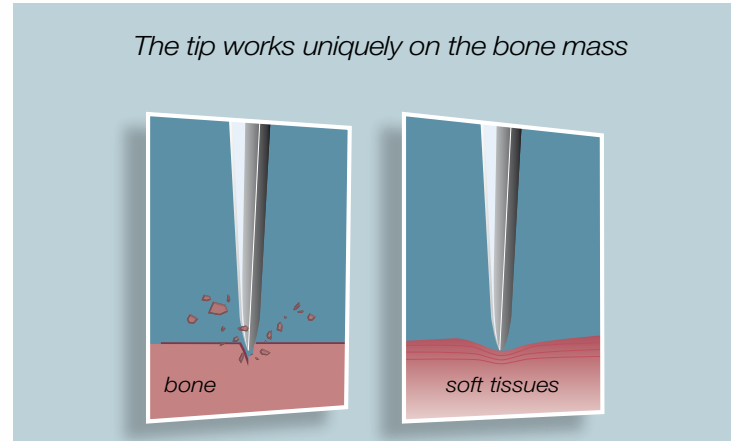
The tip works as a hammer that has **high frequency** but **low amplitude** (less than 1/10min).

NSK has developed tips designed for repeated and efficient use.

The impacts solely affect bone tissue, which offers resistance to the tip impacts. Elastic tissues with deformation abilities (compression--extension) far greater than the vibratory amplitude of the tip are not affected.

Indirect mechanical effect:

The enormous acceleration of the tip generates a localized sequence of positive and negative pressures. When the negative pressure is below atmospheric pressure, cavities appear within the liquids (irrigation fluid, blood). This is the «**phenomenon of cavitation.**» This unstable state is immediately followed by



implosion of the cavities in order to re-establish equilibrium 10.

On a macroscopic level, a multitude of bubbles with uncoordinated movements are created and followed by crepitations with a typical tonality the «cavitation noise.»

Water and aqueous media are very good vectors for cavitation effects.

On a microscopic level, the cavitation effects contribute to a microscopic dislocation of the bone tissue. Cavitation drastically increases the direct mechanical effects of the tip in the region of contact to the bone tissue.

6. Creation of the micro-movements of the tip by the transducer

In order to create, amplify, and then transmit microstrains of less than a micron, which are generated by the piezoelectric ceramics, NSK has developed an optimized assembly of high performance ceramics and metals.

This device is contained in the handpiece and called the «**transducer.**»

The **transducer** transforms the electrical impulses generated by the generator through the ceramics into mechanical energy and acts as a mechanical energy **conductor** from the ceramics to the tip.



Main Features

- 3 modes (SURG, ENDO, PERIO)
- Burst Mode
- 9 programmes (SURG x 5, ENDO x 2, PERIO x 2)
- Automatic Cleaning Mode
- Ergonomic Handpiece (LED or Non-Optic)
- Feedback Function
- Auto Tuning Function



7. Continuous and pulsed modes

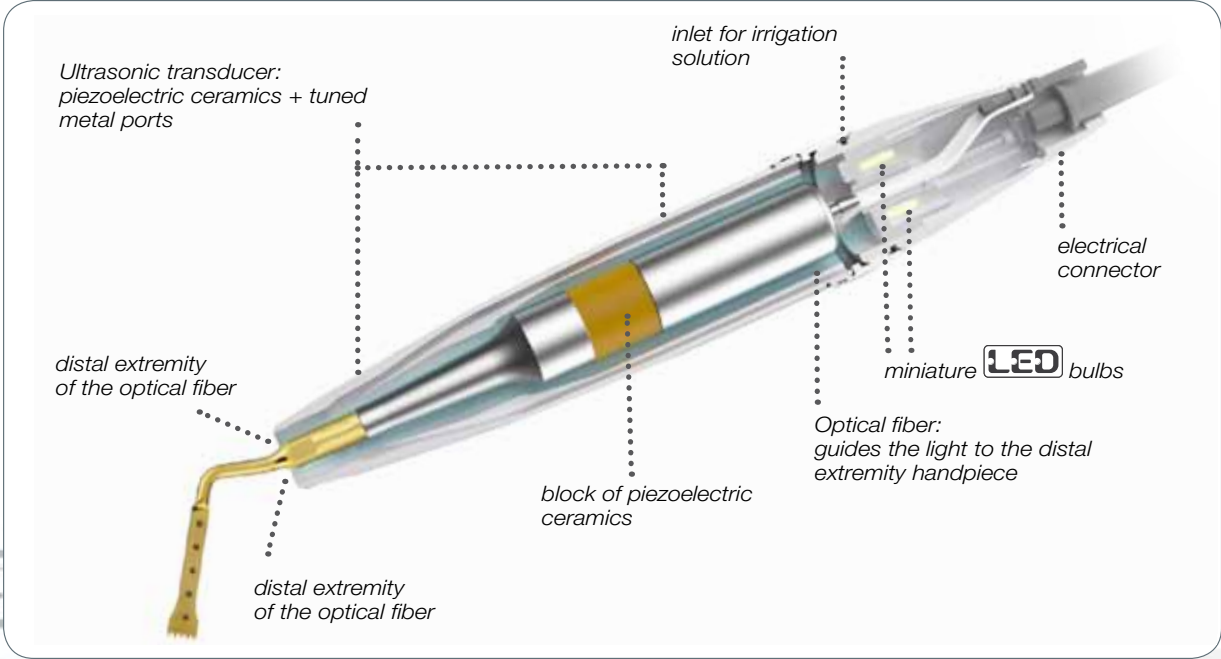
Two modes of movements of the tip are available to the surgeon:

Continuous mode

The tip is continuously animated by ultrasonic vibrations. This is the «work-horse» mode, which provides ease of use and touch to the surgeon.

Pulsed mode

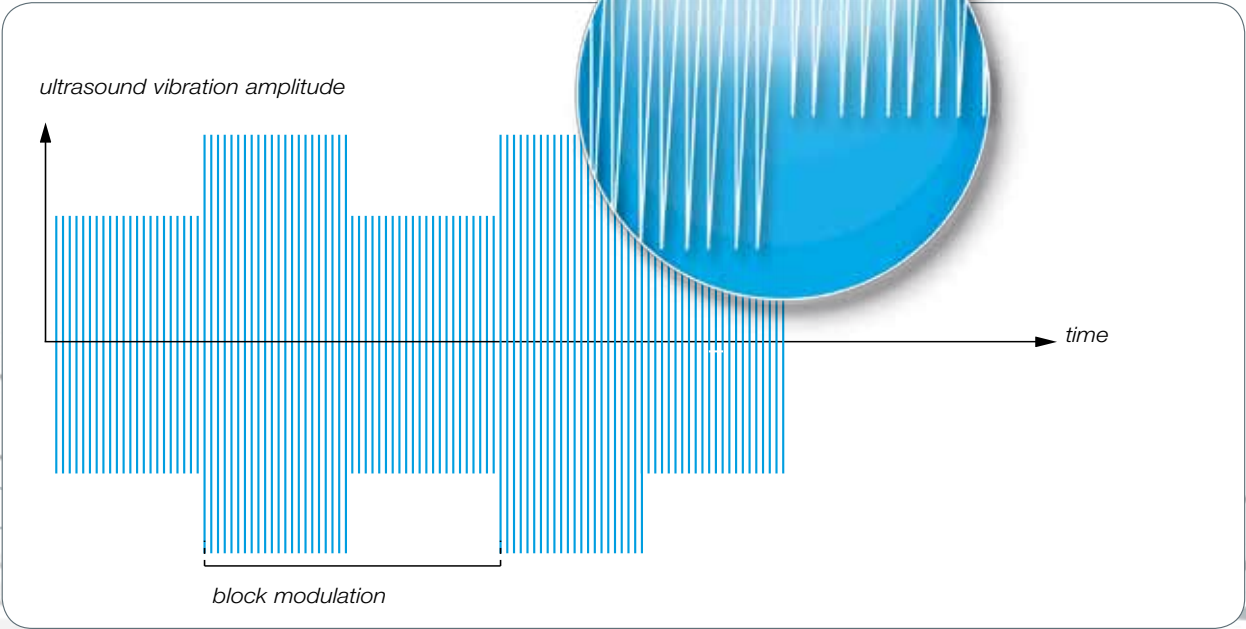
The vibrations of the tip are delivered in a discontinuous manner (hammer-drill effect). This mode can help to reduce detrimental thermal trauma in cases where there is an extended period of action in a confined area (Thermal Relaxation) The surgeon is able to choose which mode is preferable based on the density of the bone encountered.



8. Exclusivity of the osteotomy: Selectivity

Selectivity is the direct result of the action of the ultrasonic tip whose impacts of microscopic amplitude mostly affect bone tissue whereas collagen-rich elastic tissues (nerves and vessels) are preserved ③

The VarioSurg system has a pulsed mode which can be selected through the control keyboard: ultrasonic vibration amplitude is then modified (or «Pulsed») in «blocks». This creates a percussion effect promoting cutting of the hardest tissues

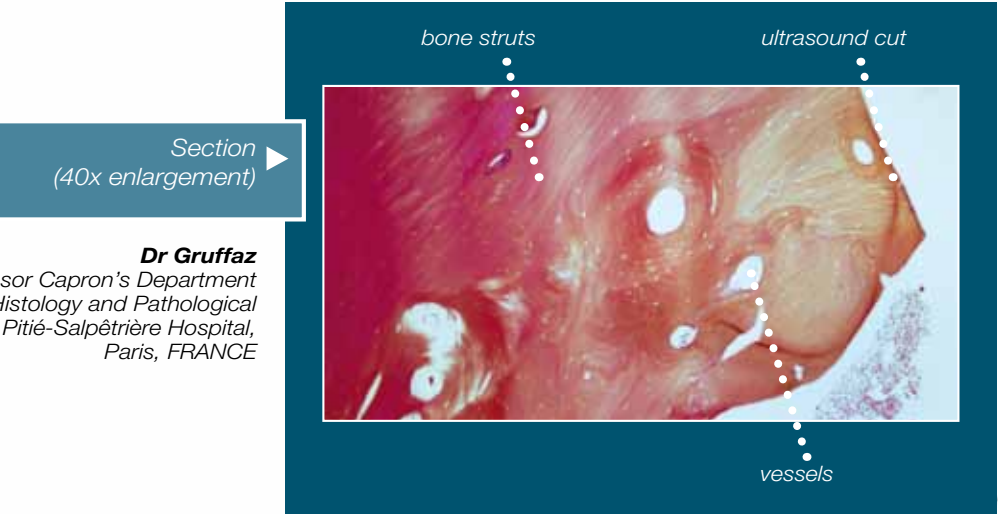


elastic
tissues
are preserved

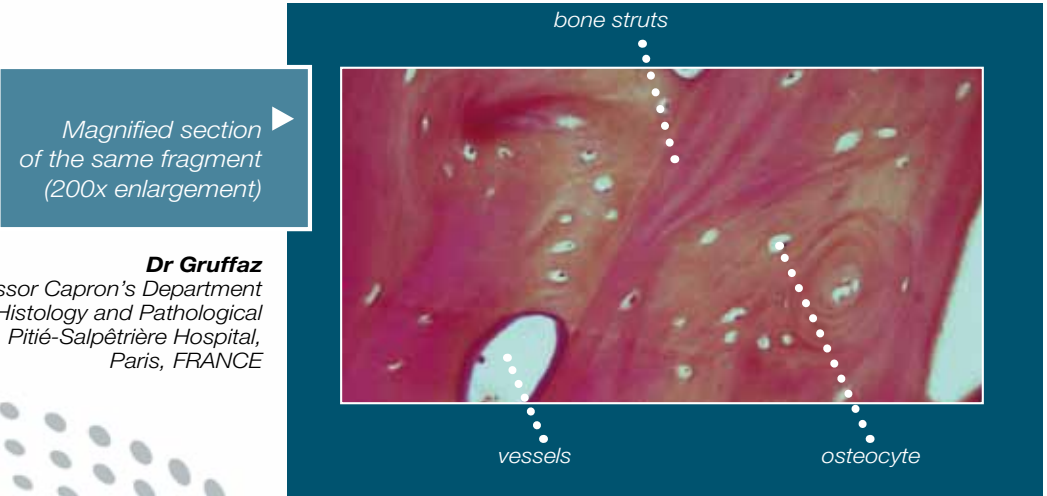
9. Histology

Histological studies of bone samples obtained by using NSK ultrasonic instruments show remarkably clean cuts, no direct or indirect signs of tissue destruction or cell damage. 2 4 5 6

Histological study of a fragment of cortical ramus bone obtained by using the VarioSurg NSK ultrasonic system. Note the clean ultrasonic cuts.



No tissue or cellular disorganisation is seen in high magnification. The bone cells (osteocytes) show no damage, cell membrane and wall (cytoplasm and nucleus) are intact. The mico-vessels contained within the bone struts show no changes.



Description

and functions

Description

1. Generator

The NSK system VarioSurg generator is designed to optimize the surgical procedure and combines efficacy, simplicity, ergonomics and strength.

The use of intuitive icons, command and control screens on the specially designed tilted cover, enables the surgeon to see all parameters instantly. The clear unambiguous display allows for at a glance reading of the program being used during surgery. The command keys are arranged logically to allow for a rapid start-up.

An ergonomic control pedal gives the surgeon complete independence. It is lightweight, equipped with an arch, and can be operated with a single foot movement, providing for surgeon comfort.

The soft and rounded contours of the generator as well as the precise adjustments of the different high precision parts decrease the deposit of dirt and surgical debris thus enabling easy cleaning and maintenance.

2. Handpiece

Lightweight and balanced, the handpiece is designed to provide the surgeon with maximum tactile sense.

An ergonomic design allows for an easy effortless hold. The handpiece is constructed from extremely high performance piezoelectric ceramics, which prevent any temperature rise within the handpiece.

NSK VarioSurg system's handpiece is equipped with a powerful integrated lighting system close to the distal end of the tip to provide for optimized vision.

3. Irrigation system

(with physiological saline for cooling and cleaning)

A high-flow irrigation system of 80 ml/min, indispensable for the prevention of any tissue injury caused by temperature increases, is incorporated into the handpiece. The tubing required to cool tissues and clean tissular debris is a disposable peristaltic tubing used throughout the NSK range of instruments.

In order to prevent any increase in thermal injury to biological tissues, a safety system that is harbored within the irrigant-driver, ensures that the generator is switched off once the bag of irrigation is empty.



High-flow ▲
refrigerated
physiologic
saline
prevents
thermal
elevation

Description

4. Tips

Bone surgery

> Multiple Impact Tips

Equipped with teeth of which the surface quality and the macroscopic shape ensure an optimal cutting effect, these «multiple impact» tips are indicated to allow fast osteotomies on dense bone.

- SG1
- SG8 (flat tip)

The SG8 tip, shorter in its cutting edge and is designed to facilitate curved osteotomies.

The SG1A and SG8A tips are an elongated version of the SG1 and SG8 tips.

They are designed to assure permanent contact of the working portion of the tip with the bone.

The surgeon is thus able to deal with all anatomical contours and challenges.

- SG1A
- SG8A
- SG30



Bone surgery

> Lateral Multiple Impact Tips

- SG2R (right lateral tip)
- SG2L (left lateral tip)

The double elbow shape of the SG14R and SG14L tips allows the surgeon to access the lateral surfaces of the mandibular angle and to perform an osteotomy of the deep surface of symphysis grafts.

- SG14R (right lateral tip)
- SG14L (left lateral tip)

> Curved multiple Impact Tips

The SG19 tip has a curved cutting edge and is specifically designed to facilitate multiplanar osteotomies (p 48).

- SG19



Description

Scrapers

> Osteo scalpel tips

The SG3 insert, because of the absence of parasitic macro-movements transmitted by the handpiece, is particularly indicated in the softening of the contours of bone grafts «*in-situ*» (that is, once the graft has been placed and secured in position). It may also be used to remodel contours of osteotomy edges (osteoplasties). It is designed to remove bumps, spikes and other contour irregularities that may traumatize the periosteum and the gum. It may also be used in the harvesting of cortical shavings.

- SG3 (scalpel with curved flat surface)

The very fine and sharp SG4 tip is indicated for ultrafine osteotomies. It is mainly used in cases involving narrow alveolar crests where one needs to perform extension osteotomies (p. 55). The ultra fine osteotomies that can be made by the SG4 tip is deeply appreciated by surgeons during their initial learning curve.

- SG4 (flat scalpel)

Rounded in shape, it is indicated for remodeling the contours and the form of bone grafts but also for the preparation of the graft site (osteoplasties).

- SG5 (circular scalpel with elbowed flat surface)



DVD
Sequence

Extraction Tips

The specific shape and surface of SG17 tips allows the surgeon to access more easily the desmodontal space.

Extraction tips are very useful in cases involving ankylosis of teeth.

Because it spares biological tissue, the SG17 tip is indicated in cases of avulsion in order to preserve the bony peri-radicular tissue.

- SG17
- SG18R (right lateral tip)
- SG18L (left lateral tip)



a specially
studied

design

Description

Implant preparation

> Conical Diamond Coated Implant Tips

Diamond coated implant tips are built for implant surgery especially in case of low-density bone or short bone height.

Based on the «selectivity» principle, «ultrasonic implant surgery» is particularly adapted to dangerous anatomic regions (sinus membranes, dental nerve).

- SG15A
- SG15B
- SG15C
- SG15D

The SG15A is reserved for starting the conical preparation for implant surgery.

The SG15B is specifically designed to increase the diameter of implant osteotomy. Horizontal markings exist to indicate the depth of the preparation.



DVD
Sequence

The SG16A is designed to create a thin cylindrical preparation (2.0 mm diameter) and it is used after the SG15B tip.

The SG16B tip is reserved for a thicker cylindrical preparation (2.6 mm diameter)

- SG16A
- SG16B

Sinus lift

> Classic Diamond Tips

Coated with a surface of diamond powder, the SG7D and SG6D tips make cutting actions easier. Their uniform surface insures impact distribution allowing effectiveness, sensitivity, and depth-control. These diamond tips are indicated for thin bone.

- SG7D (ball tip)
- SG6D (flat tip)



DVD
Sequence

Description

Sinus membrane tool > Soft Raspatory Tips

Their rounded flat and non-cutting form has a specialized ergonomic shape designed for human anatomic contours (sinus cavities, cystic lesions). They allow atraumatic reflection of the sinus membrane in dental implantation and full enucleation of cysts.

The SG11 tip is indicated for making the initial reflection of the sinus membrane from the lateral window.

The SG11 tip acts by compressive micro movements, whose microscopic amplitude prevents sinus membrane injury.

Various curvatures (SG9 and SG10) allow the surgeon to reach dead end sinus cavities or cysts.

- SG9
- SG10
- SG11



▲ SG9
ORDER CODE : Z305110



▲ SG10
ORDER CODE : Z305111



▲ SG11
ORDER CODE : Z 05112



DVD
Sequence

NSK tips: specifically
ergonomic **shapes**

designed for **surgeons**

Indications

and Surgical Procedures

Indications

Harvesting bone from the mandible

The mandible is the most widely used surgical donor site for pre-implant reconstruction ¹⁴ ¹⁵. The harvested membranous cortical bone is dense and stable over time and has limited resorption.

Posterior mandibular harvesting or “ramus sampling”

The donor area extends onto the mandibular body from the external oblique ridge to the mental foramen and on the anterior half of the ascending ramus of the mandible, anterior to the dental foramen in which lies the dental pedicle.

The inferior alveolar pedicle (nerve, artery, and vein) is in intimate contact with the external mandibular cortex. Damage to the dental pedicle is the major surgical risk of ramus harvesting.

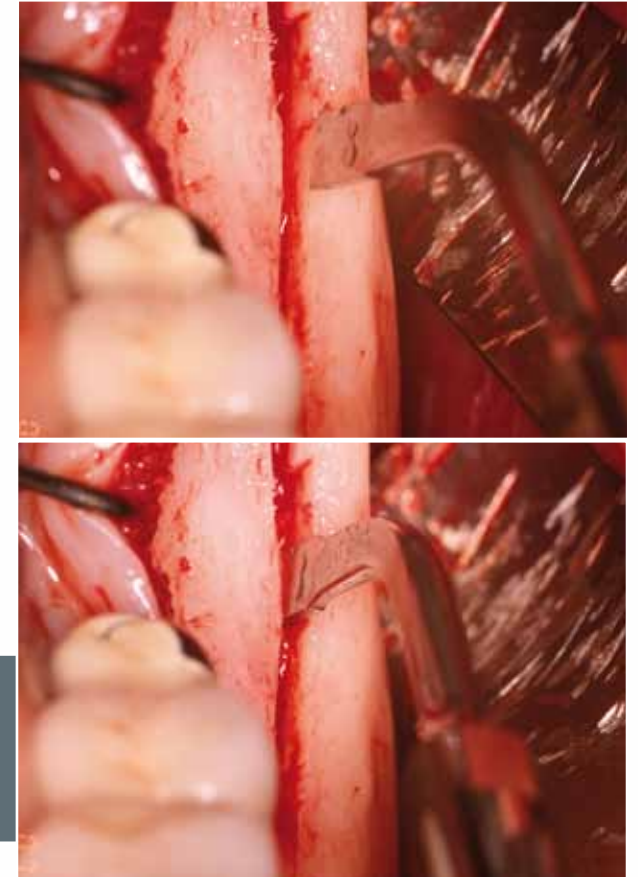
The NSK VarioSurg ultrasonic system decreases risk of injury to this neurovascular bundle.



Treatment sequence

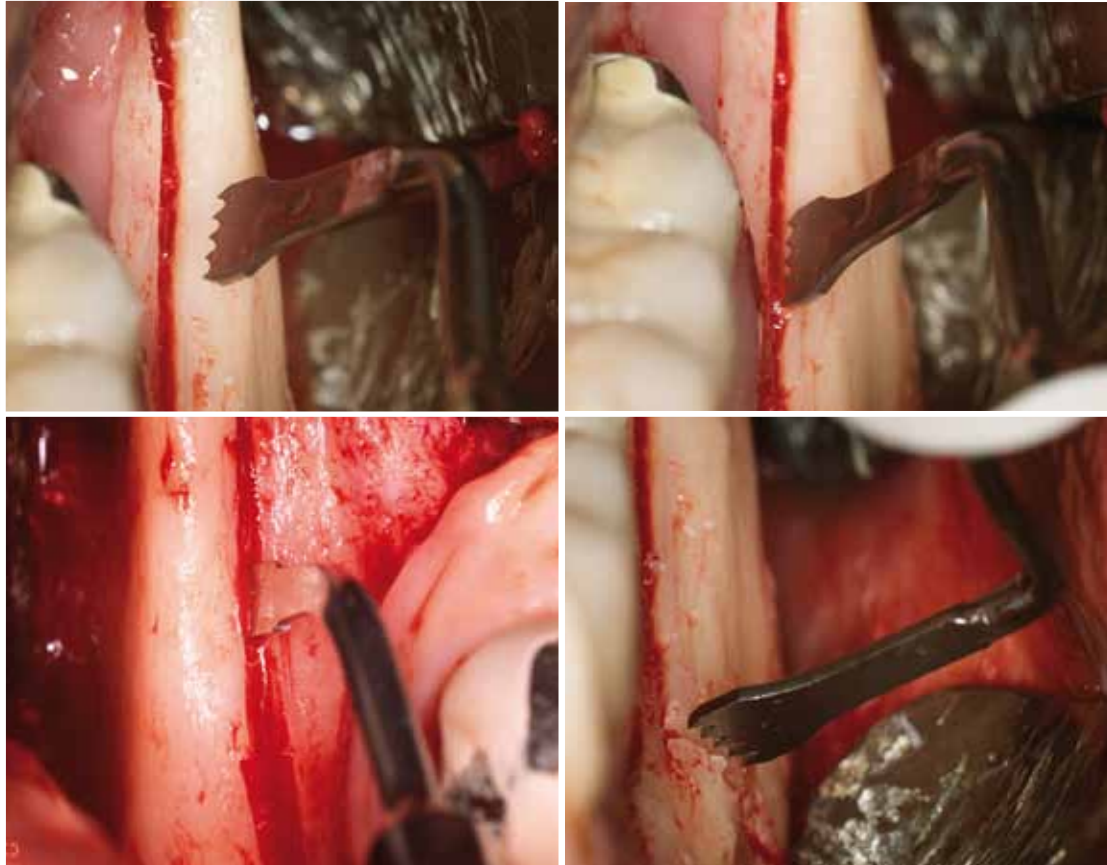
1. Accurate anatomical evaluation of critical anatomic organs (dental pedicle, dental roots) by computed tomographic scanning
2. Begin the osteotomies using the SG4 tip.
3. Perform the osteotomies using the SG1, SG8, SG14R, and SG14L tips.
4. The osteotomies mostly involve the cortical sheath of the oblique ridge.
5. Double cleavage and dislocation of the bone graft under direct visual control.
6. Remove spikes and sharp angles from the donor site using the SG3 and SG5 tips.

Precise and limited osteotomies are afforded by the specially designed tips



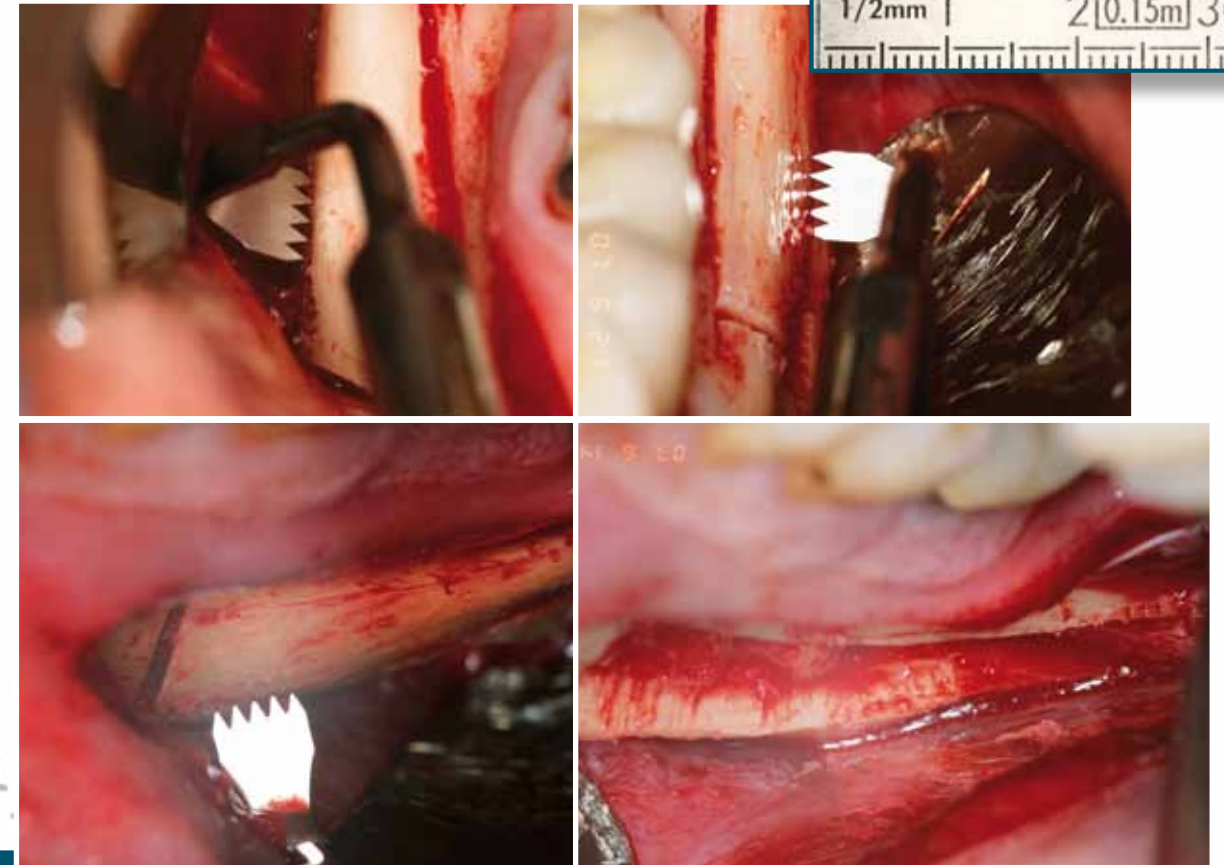
Indications

Posterior mandibular harvesting



▲ The multiple impact tips guaranty optimized efficiency

Treatment sequence



▲ The working portion of the tip is orthogonal to the cortical surface of the bone for maximized action



Indications

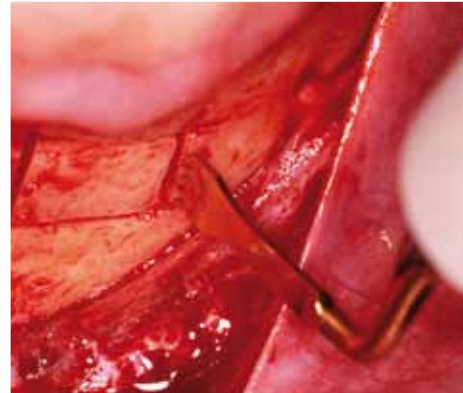
Anterior mandibular harvesting or “mandibular symphysis sampling”

The anterior mandibular donor site or “symphysis” is easy to access, centered on the central portion of the mandibular body.

It extends over a rectangular area delineated above by the apices of the incisors and canines, laterally by the mental foramen through which the mental nerves emerge and by the inferior border of the mandible. It provides a block graft with more cancellous bone than the ramus.

The dental roots, the emergence of the labio-mental pedicles, the incisor nerve and potential endosseous ending of the lingual artery are the main anatomical dangers of symphysis sampling.

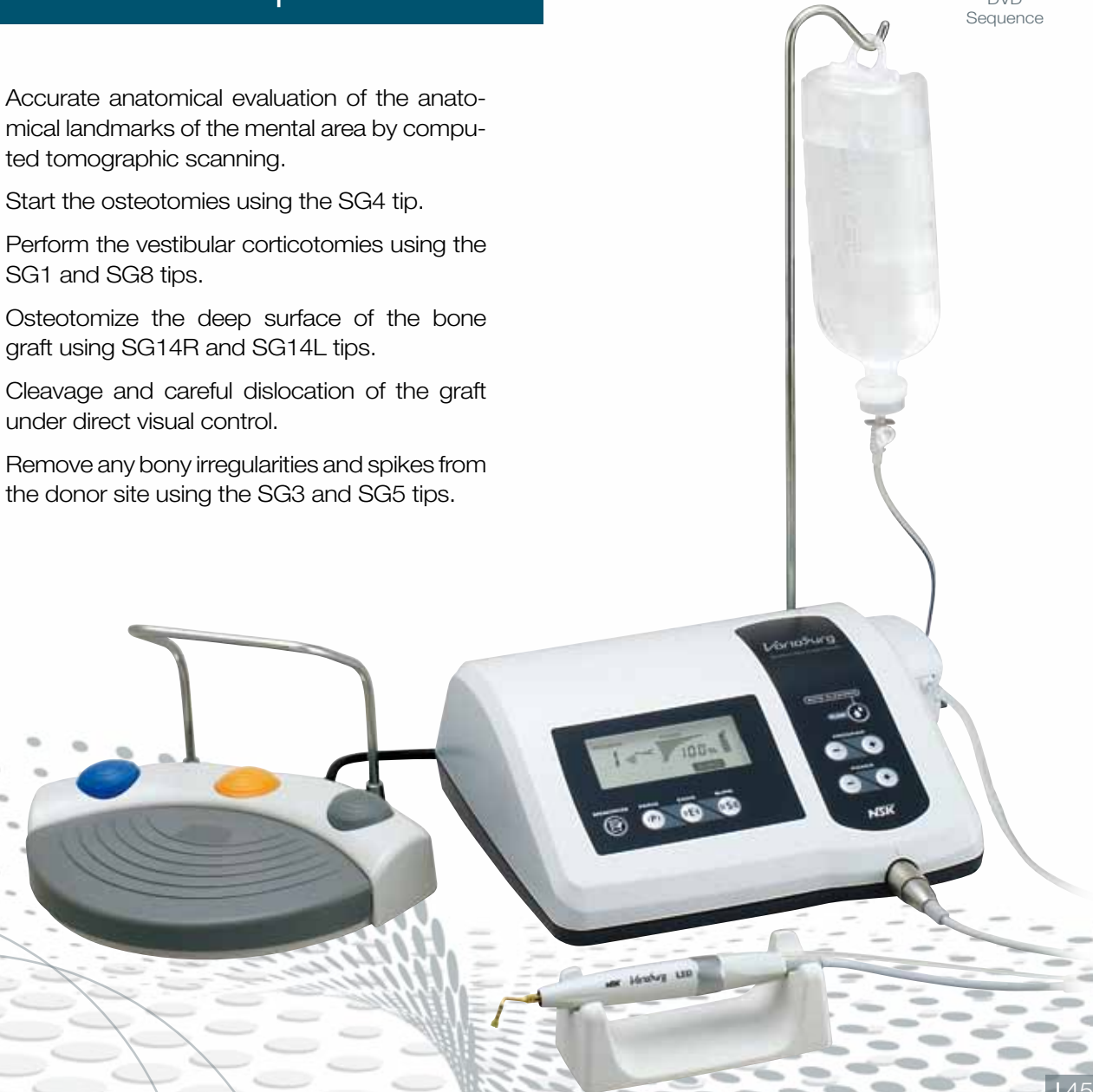
The NSK VarioSurg ultrasonic system reduces the morbidity of symphysis sampling.



*Piezosurgery allows
all kinds of symphysis harvesting*

Treatment sequence

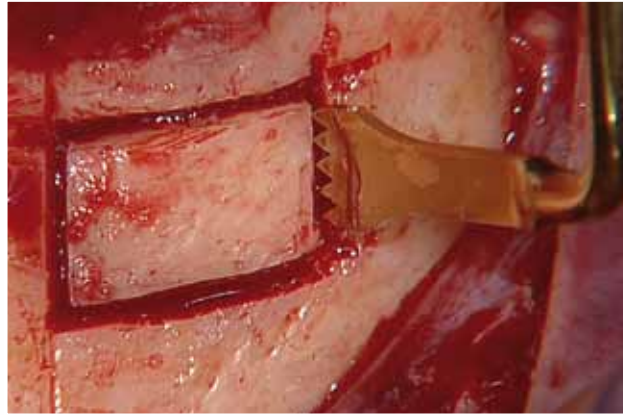
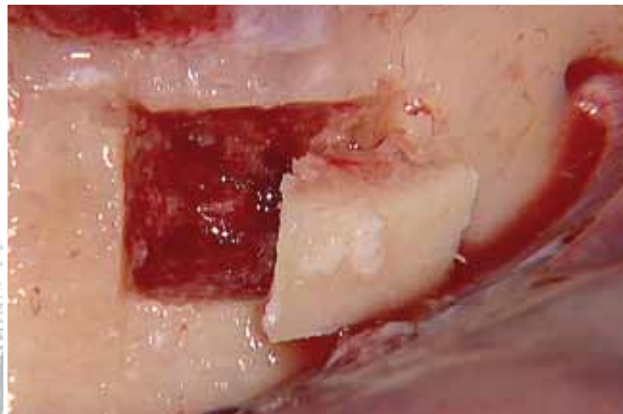
1. Accurate anatomical evaluation of the anatomical landmarks of the mental area by computed tomographic scanning.
2. Start the osteotomies using the SG4 tip.
3. Perform the vestibular corticotomies using the SG1 and SG8 tips.
4. Osteotomize the deep surface of the bone graft using SG14R and SG14L tips.
5. Cleavage and careful dislocation of the graft under direct visual control.
6. Remove any bony irregularities and spikes from the donor site using the SG3 and SG5 tips.



Indications

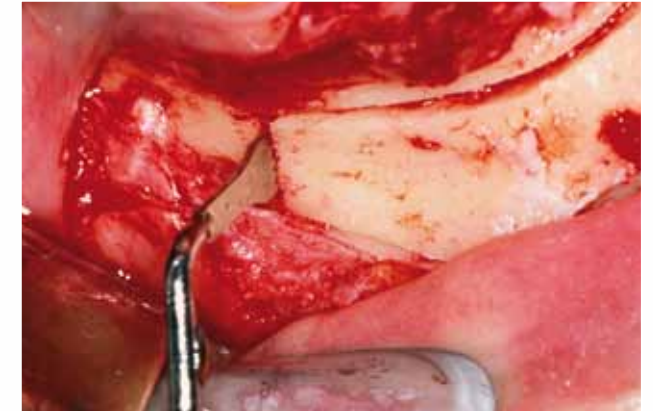
Unilateral anterior mandibular sampling

*Precise osteotomies
characterize ultrasonic surgery*



Complete anterior mandibular sampling

*The selective action
of the ultrasound allows
the osteotomy to be at close
proximity to the mental nerve*



Indications

Corticotomy of curved surfaces

Working with the changing anatomic form of the maxillo-mandibular unit is part and parcel of oral surgery.

The SG19 tip, which has a series of teeth on its convex working surface, is indicated for corticotomies in curved anatomic surfaces or areas that are difficult to access.



A curved tip for curved osteotomies

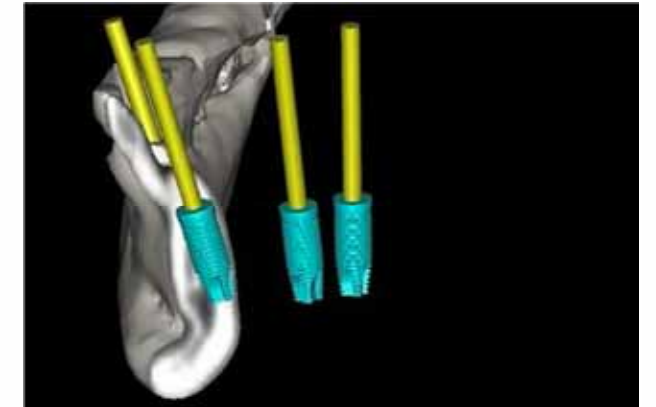


Treatment sequence

Leveling of the alveolar crest

In procedures involving extraction with immediate implantation, the leveling of the alveolar crest is often needed.

The SG1 tip in its original version (SG1) or in its elongated version (L SG1) permits a controlled leveling of the crest and assures a width that is large enough for implant placement.



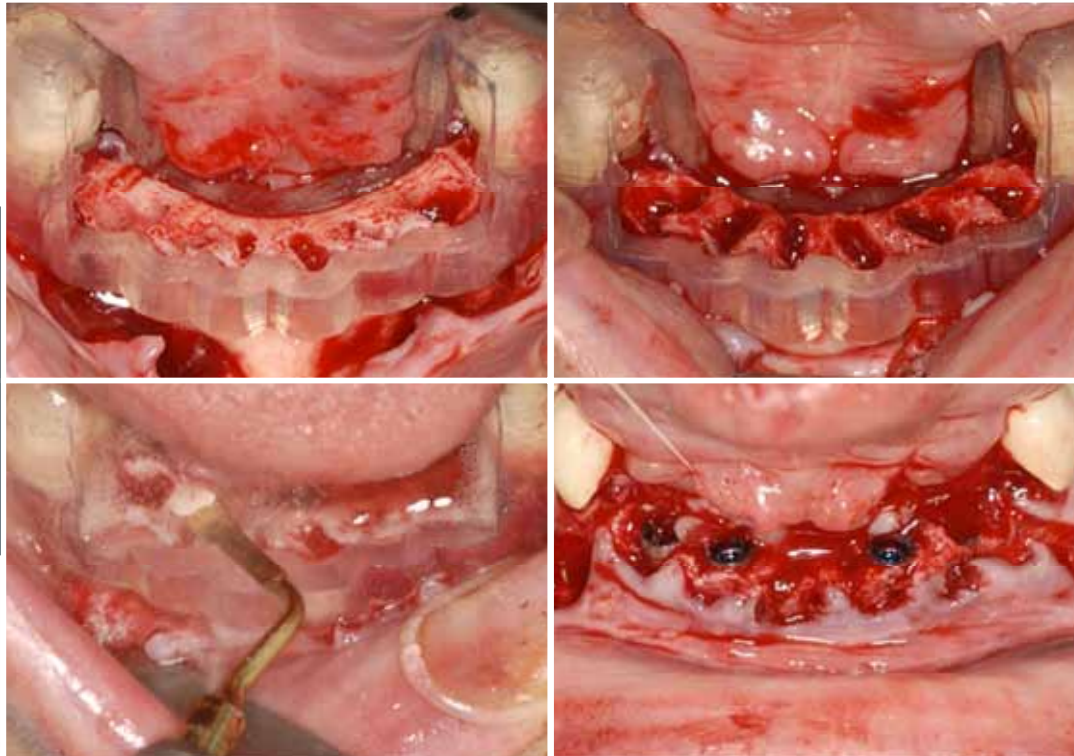
An adapted design for maximized efficiency



Indications

Leveling of the alveolar crest

▶
*The precision
of the cut is
one of the
principal
characteristics
of ultrasonic
surgery*



an **unequalled**
efficiency

Indications

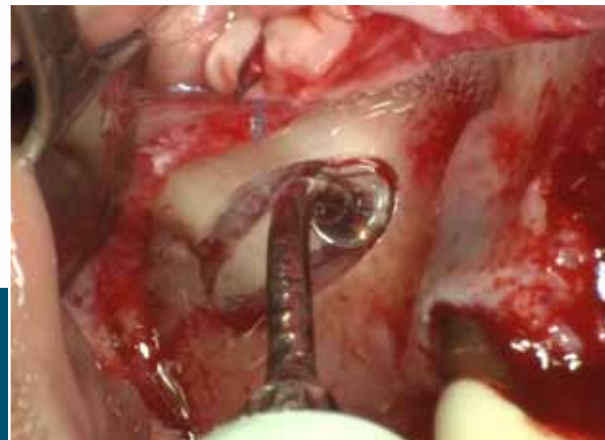
Sinus graft (Lateral window procedure)

Lateral maxillary posterior bone augmentation is commonly indicated in implantology.

The sinus membrane, which lines the base of the sinus cavity, is a particularly important anatomical feature, which should be preserved during the operation.

The sinus membrane is a functional and anatomical barrier between the respiratory chamber and residual bone 20

The selectivity of the specially conceived tips preserves the integrity of the sinus membrane throughout the treatment sequence



Treatment sequence

1. The initial localization of the sinus cavity through a non-invasive osteotomy to reach the sinus membrane is performed using the SG6D and SG7D diamond coated tips.
2. Centrifugal reflection of the sinus mucosa from the rim of the osteotomy by using the SG11 tip.
3. Progressive reflection of the sinus membrane with the SG9 and SG10 tips. Eventually, the diamond coated SG6D and SG7D tips can be used to remove, if necessary, any accessory endosinus bony partitions under visual control.
4. Gentle filling of the sinus cavity with bone substitutes mixed with or without autogenous bone.



Indications



Implant surgery: Conical preparations for implant osteotomy

Conical tips are used
to begin implant preparations ▼

Atraumatic ultrasonic implant surgery is particularly adapted in patients with low bone density or in cases where specific anatomical structures need to be preserved (sinus membrane).

The surgical procedure starts with conical diamond covered tips and ends with cylindrical diamond covered tips. 21



Treatment sequence



Cylindrical finishing preparations for implant surgery

Adapted
cylindrical
tips are used
for implants
of different
diameters ▼



Indications



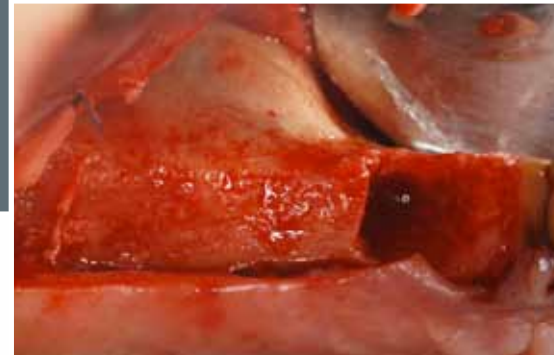
Osteoplasties

Osteoplasties using the SG4 and SG5 tips are indicated to soften the cutting edges of corticotomies of the donor site or to remodel the recipient site. This allows precise adaption of the graft.

At the grafted site, osteoplasties can remove sharp edges, which may be responsible for soft tissue irritation, either at the periosteum or the buccal mucosa.



The working edge of the tip allows for controlled osteoplasties



Treatment sequence

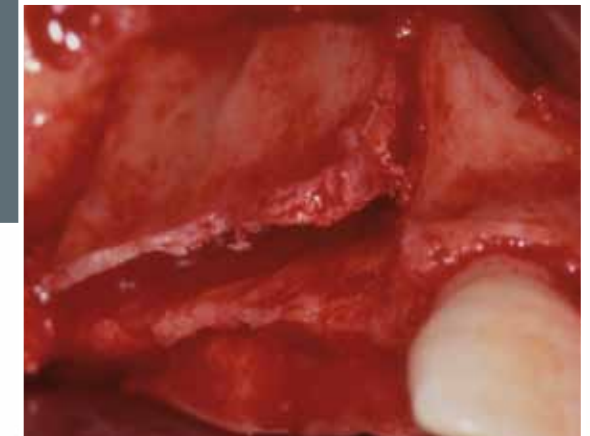
Expansion osteotomies

Expansion osteotomies are indicated in the positioning of dental implants in the presence of a narrow alveolar crest without the need for appositional bone grafting.

Expansion osteotomies are performed using the SG4, followed by the SG1, and SG8 tips.



The integrity of the osteotomized sockets ensures that the expansion procedure is dependable



Indications

Extraction and oral surgery

Mechanical and thermal trauma and iatrogenic bone loss are the main complications of tooth extractions. Patients have particularly poor experiences as a result of the aggressive nature of extraction procedures.

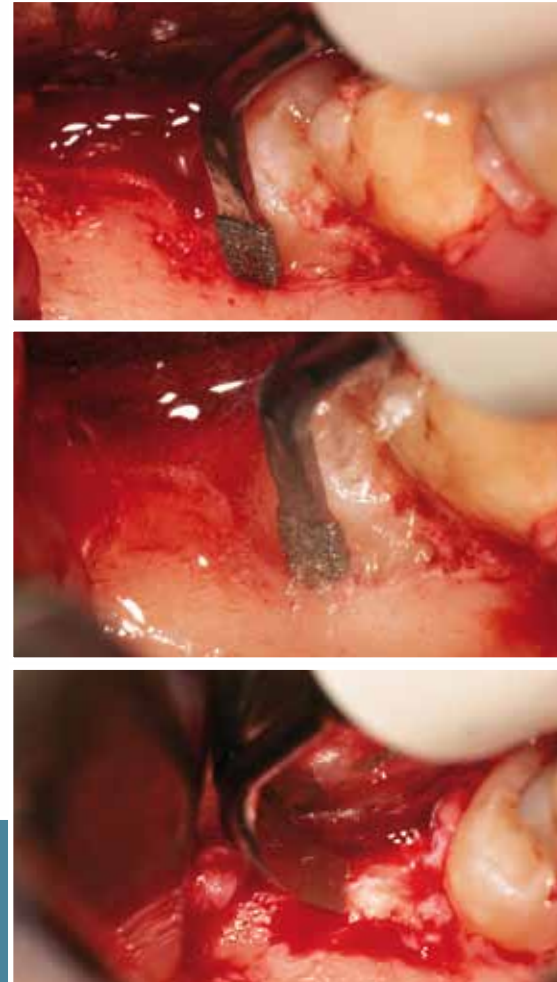
Ultrasonic instruments provide a selective, controlled, and gentle osteotomy. The gentle atraumatic extraction changes the conditions which patients are subjected to during this and other oral surgery procedures, providing each patient with increased comfort.

1) Surgical extractions

Severely decayed teeth or roots, can be difficult to extract because of lack of grasp. The diamond coated SG6D and SG7D tips allow clean, ergonomic, and clear periodontal osteotomies.

The lack of perioperative injury contributes to an uncomplicated post-operative course and reduces the risk of alveolitis.

Differently shaped tips provide maximal access

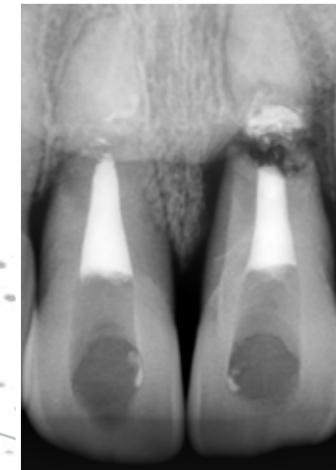


Treatment sequence

2) Syndesmotomies

The loss of bony tissue is a frequent consequence encountered after extraction of ankylosed teeth or teeth with short roots.

The SG17 inserts, thin, long and highly penetrating were specially conceived to recreate a cleavage plane between the bony tissue and the dental tissue. This favors easy mobilization of ankylosed dental organs or teeth with short roots, and allows for economic avulsion of biologic tissues.



The avulsion of ankylosed tooth roots requires adapted instrumentation



Indications

3) Avulsion of wisdom teeth and impacted teeth

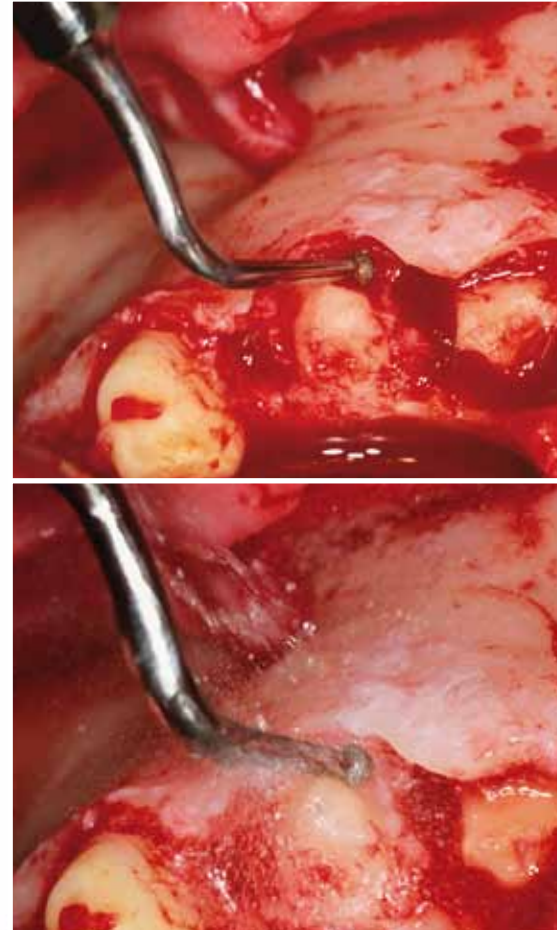
Ultrasonic wisdom tooth surgery is a bone sparing surgery, which avoids needless bone sacrifice. It reduces collateral damage on vessels and the dental nerves and ensures that postoperative recovery is simple.

The bone cutting is clean without thermal trauma thus decreasing the risk of alveolitis. The decrease in periosteal elevation and muscular reflection promotes soft tissue healing.

It is a gentle operation, that increase patient comfort and can be performed under local anesthesia, reducing need for general anesthesia.

The SG6D and SG7D diamond coated tips allow osteotomies that are efficient but well controlled.

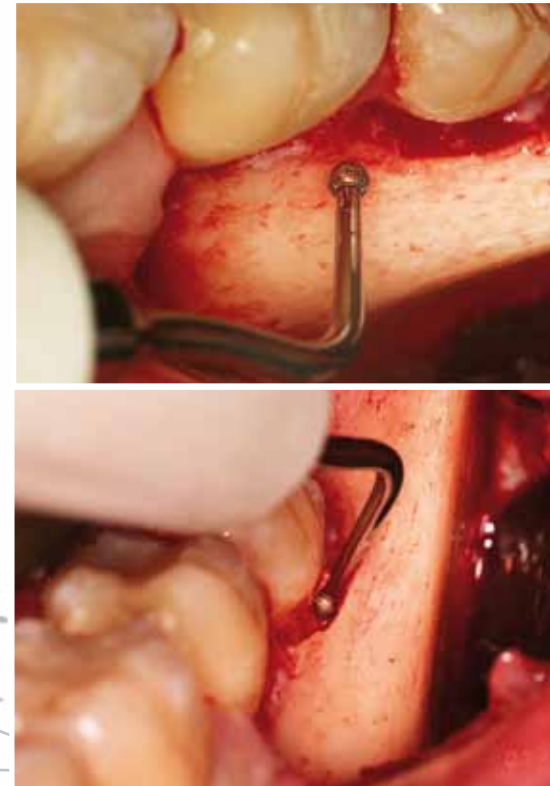
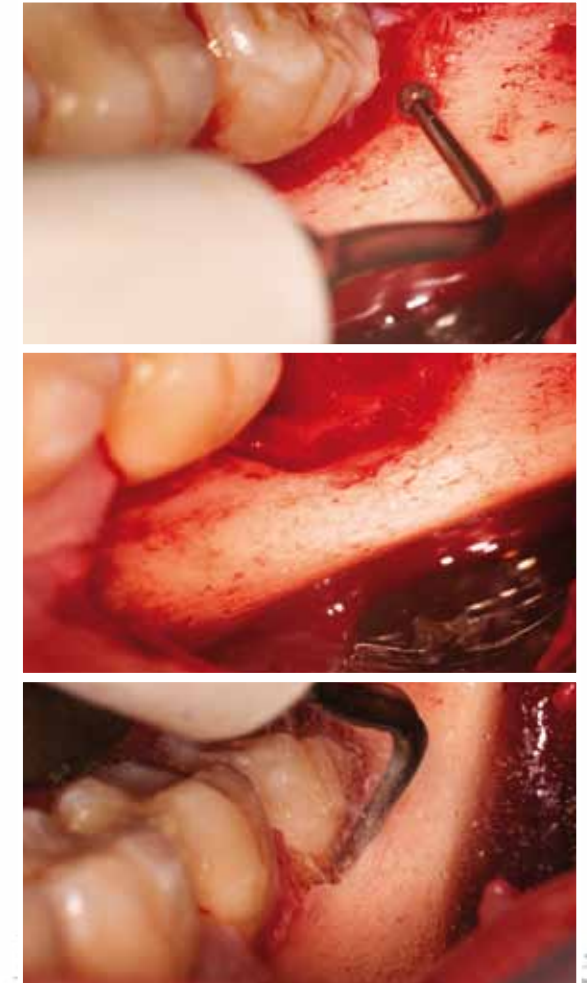
Nevertheless, in case of large bone volume, it is recommended to initiate bone cutting with conventional rotational instruments (Surg XG Plus – NSK, Prado – NSK) before using NSK VarioSurg ultrasonic instruments. This allows the completion of the osteotomy and tooth extraction or removal of dental apices without increasing the risk to damaging the neurovascular bundle.



▲ An optimal action
for a minimal sacrifice of bone

Treatment sequence

Avulsion of wisdom teeth



without risk
apical approach

and **inter radicular** lesions

Treatment sequence

Apical and lateral root cysts

Periodontal ligament injury and dental trauma constitutes the complications that are the most frequently encountered in apical surgery.

The SG7D diamond coated ball tips are particularly useful for creating the surgical approach without putting at risk tooth apices and enabling septic cavities to be effectively cleaned and curetted.

The specific curves of the SG7D tips allow easy access to hidden areas (forked, curved roots).



Surgical precision and preservation of biological tissues characterize ultrasonic endodontic surgery

Indications

Surgeries of maxillary odontogenic cysts with intra-sinusal extension

Treatment of cystic lesions requires a sufficiently wide approach to allow complete enucleation. Non-mutilating treatment requires minimal sacrifice of bone and absence of trauma to adjacent teeth.

In the maxilla, the sinus membrane and the respiratory mucosal lining of the floor of the nasal fossae are structures, which need to be preserved during apical surgery.

In the mandible, the inferior alveolar and mental nerve and their emergence are sites of surgical risk.

Several factors are necessary for a satisfactory result:

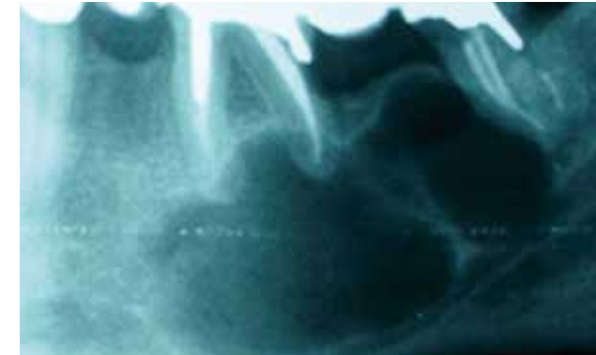
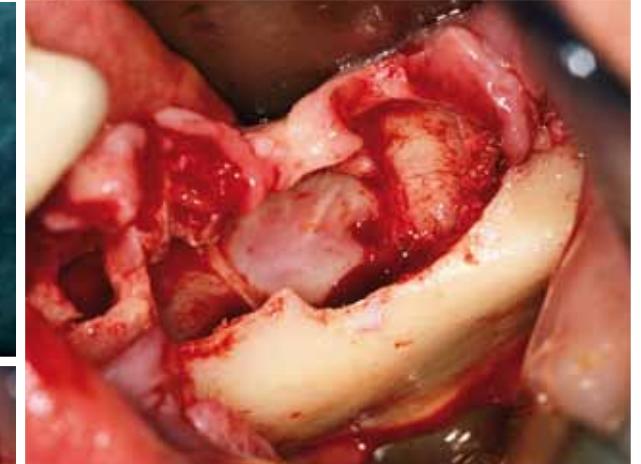
- Complete removal of the cystic lesion (enucleation) without leaving any debris that may cause recurrence.
- Preservation of the integrity of the cystic lesion in order to avoid dispersal of its infected contents.

The SG9 and SG11 reflection tips are designed for difficult to reach areas and thus preventing unnecessary damage to adjacent bone. They allow the release of adherent cyst walls from the adjacent dental nerve.

The SG8 tip,  short in length at its working edge, permits curved osteotomies, which conforms to the contours of cystic lesions



Treatment sequence



▲ Surgical precision allows the preservation of biological tissues when using ultrasonic endodontic surgery

Sterilisation

and decontamination



Decontamination

Sterilization and decontamination cycle

1. Drain the irrigation system at the end of the intervention
2. Sort instruments
3. Clean cables and handpiece with medical wipes
4. Disinfection of tips, tip holder(s), dynamometric wrench and stainless steel cassette by immersion
5. Package in double bags with indicator
6. Autoclave
7. Storage

Disposal of single use irrigation tubes

Non-immersible parts include the cable and handpiece.

3. Clean cables and handpiece with medical wipes

Immersible parts: tips, tip holder(s), dynamometric wrench, and stainless steel cassette

- 4.1 Disinfection of tips, tip holder(s), dynamometric wrench and stainless steel cassette by immersion
- 4.2 First rinse
- 4.3 Subject tips, tip holder(s), dynamometric wrench, and stainless steel cassette to ultrasound or brush them with a non-metallic brush
- 4.4 Second rinse
- 4.5 Pass the tips, tip holder(s), dynamometric wrench, stainless steel cassette through the washer-disinfector machine

Recommendations

- Do not expose handpiece to ultraviolet rays (risk of discoloration and defacement)
- Do not decontaminate the handpiece and cable by immersion
- Confirm that the cable is not twisted or kinked when it is placed in the stainless steel cassette
- Place the instruments in the middle or upper part of the autoclave to avoid excessive overheating



▲ Sterilization cassette

and **sterilization
decontamination**

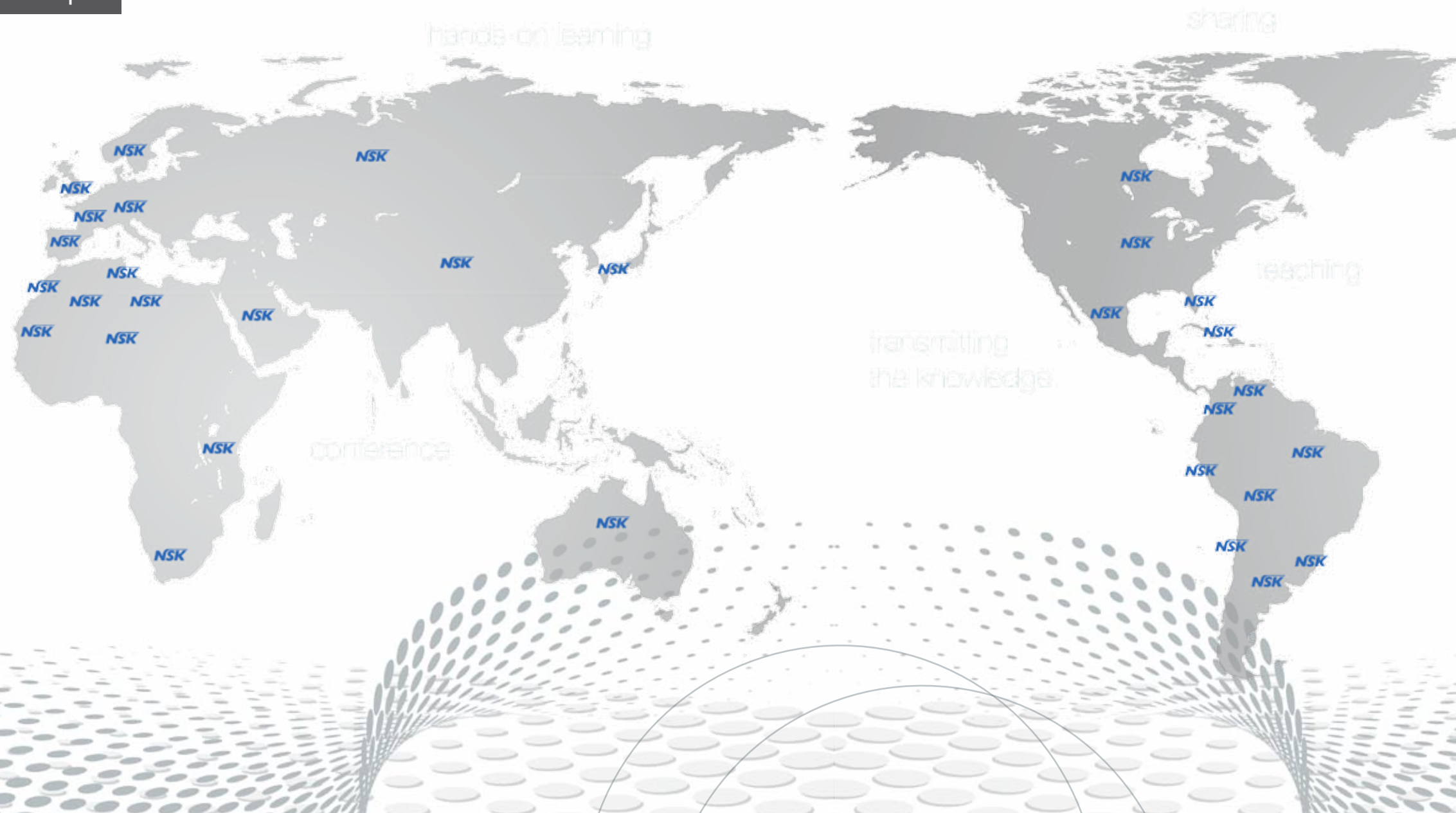
of the **components**



Workshops

Transmission of knowledge and hands-on learning



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TRANSMIT
KNOWLEDGE**

NSK's great sum of know-how has led to the creation of a large range of high performance and high quality products for both the dental and medical fields.

Enriched by this experience, NSK has decided to promote the sharing of this acquired knowledge through numerous workshops and conferences organized through out the year and all over the world, thus signaling the company's solidarity with practitioners.

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Due to NSL's policy of continuous quality improvement, specifications included in this manual are subject to change without notice.

VarioSurg Complete Sets with LED Handpiece

MODEL: **VSRG OPT(120V)** ORDER CODE: **Y1001928**

MODEL: **VSRG OPT(230V)** ORDER CODE: **Y1001929**

Contents

- Control Unit • LED Handpiece with 2m cord
- FC-51 Foot Control • Sterilisation Cassette
- Handpiece Stand • Irrigation tube (5 pcs.) and other accessories
- Basic-S Kit (SG1, SG3, SG5, SG6D, SG7D, SG11 and Tip holder)

VarioSurg Complete Sets with Non-Optic Handpiece

MODEL: **VSRG 120V2(120V)** ORDER CODE: **Y1001939**

MODEL: **VSRG 230V3(230V)** ORDER CODE: **Y1001940**

Contents

- Control Unit
- Non-Optic Handpiece with 2m cord
- FC-51 Foot Control
- Sterilisation Cassette
- Handpiece Stand
- Irrigation tube (5 pcs.) and other accessories
- Basic-S Kit (SG1, SG3, SG5, SG6D, SG7D, SG11 and Tip holder)

Specifications

Control Unit

- Frequency : 28-32 kHz
- Power Supply : AC120V or 230V 50/60 Hz
- Irrigation Flow Rate : 9-90 mL / min
- Programs : SURG x 5, ENDO x 2, PERIO x 2
- Dimensions : W268 x D230 x H103 (mm)

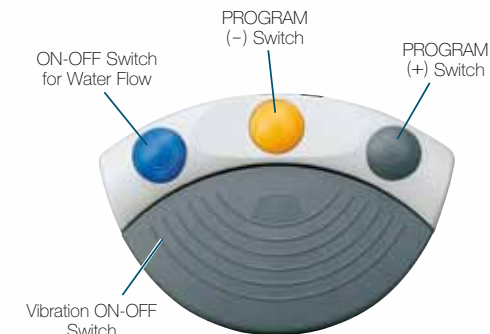
Foot Control

- Foot Control Functions :
ON-OFF Switch for Water Flow,
PROGRAM (+) Switch, PROGRAM (-) Switch
Vibration ON-OFF Switch

Foot Control

Hands-free Program Adjustments Via Foot Control

The VarioSurg Foot Control, which meets IPX8 Standards for medical foot control systems, allows perfect control during delicate surgical procedures. A bracket enables the Foot Control to be easily raised or moved without using your hands during use.



MODEL: **FC-51** ORDER CODE: **Z316001**

- With 2m cord

Sterilization Cassette

The Sterilization Cassette is designed for the safe processing and storage of VarioSurg components.



MODEL: **VA-SG-CASE** ORDER CODE: **20001326**

- With 2m cord



MODEL: **VA-SG-CASE** ORDER CODE: **20001326**

- Dimensions : W281 x D171.5 x H47 (mm)
- With appropriate compartments for handpiece, cord, tip replacement wrench and tip holders

Carrying Case (Optional)

The NSK Carrying Case can accommodate all VarioSurg components.



MODEL: **Carrying Case (VarioSurg)** ORDER CODE: **Y1001907**

- Dimensions : W469 x D344 x H180 (mm)

Tip Kits



MODEL: **Basic-S Kit**
ORDER CODE: **Y900687**

- Contents
- SG1, SG3, SG5, SG6D, SG7D, SG11
 - Tip holder



MODEL: **Endo-S Kit**
ORDER CODE: **Y900691**

- Contents
- G1-S, E30RD-S, E30LD-S, E31D-S, E32D-S
 - Tip holder



MODEL: **Sinus Lift Kit**
ORDER CODE: **Y900689**

- Contents
- SG1, SG3, SG6D, SG9, SG10, SG11
 - Tip holder



MODEL: **Implant Preparation Kit**
ORDER CODE: **Y900774**

- Contents
- SG15A, SG15B, SG16A, SG16B
 - Tip holder



MODEL: **Bone Cut Kit**
ORDER CODE: **Y900688**

- Contents
- SG1, SG2R, SG4, SG2L, SG6D
 - Tip holder

Spare Parts

MODEL	ORDER CODE
 VS-LED-HPSC LED Handpiece (with Cord 2m)	E1084
 VA-SGN-HPSC Non-Optic Handpiece (with Cord 2m)	E377
 E Tip Replacement Wrench For V10-S	Z217399
 VS Tip Wrench For SG1A, SG8A (CR-40)	Z305350
 Tip Wrench (CR-30)	10000977
 Tips Holder	20001327
 Handpiece Stand	Z1029201
 Irrigation Tube (Pack of 5)	Y900113
 Tube Holder (Pack of 7)	Y900767
 VA-SG-CASE Sterilization Cassette	20001326



Washable in the thermodisinfectior
Autoclavable up to 135°C



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