

BIPORTAL ENDOSCOPIC SPINE SYSTEM



www.max-more.com

BESS PHILOSOPHY AND DEVELOPMENT BY DR. CHOI

Biportal Endoscopic Spine System, BESS, comes out to be one of new trends of treatment of degenerative spine disorders. Literally it has a deeper origin from bilaterally (bilateral approach, one(left) side for scoping and the other(right side) for working) biportal arthroscopic approach by Dr. Schubert and Hoogland1), 2005. Several years later, it was released again with new shape using an arthroscopic system with a shaver technique using unilaterally (same sided approach, proximal one for scoping and distal one for working) biportal endoscopic surgery by Dr. Soliman, 2015. Recently this technique has been rapidly developed with its unique hybrid concept of microscopic approach and endoscopic techniques with arthroscopic facilities. It recently came to broaden its surgical indications from discectomy via decompression to endoscopy-assisted fusion. Dr. Choi is leading the ongoing development of this system in close cooperation with MaxMoreSpine.

It is standing on a natural proceeding way of development of ultimate MISS (minimally invasive spine surgery) with minimally invasiveness and preserving innocent structures to successfully eliminate pathology in surgically microscopic environment in helps of outstanding development of optic engineering. Consequently, it can give an alternative option to decompression-only rather than wider decompression and fusion to senile patients with medical commodities. And many patients could escape from another bigger revision surgery due to adjacent segment disease(ASD) with higher incidence, 9~30% within 5 years.

Indications for BESS

- Lumbar disc herination(LDH) and Cervical disc herniation (CDH)
- Revision surgery for recurrent LDH
- Lumbar Spinal Stenosis
- Degenerative Spondylolisthesis (grade I and II)
- Lumbar Foraminal Stenosis
- Adult Isthmic Spondylolisthesis (spondylytic spondylolisthesis)
- Adjacent segment disease(ASD) after fusion surgery
- Savage operation at the same level on fusion surgery
- Exploration and Irrigation for epidural abscess
- Ossification of yellow ligament(OYL) at thoracolumbar level

Advantages for BESS compared to open surgery

• BESS is simple and safe and mostly no need of bloodtransfusion, which means less tissue destructive and vital-stable surgery. So it can spread very fast in local private hospital with less amount of equipment.

- Degenerate. Spine disease is not a big problem. It is just like a cold. But the spine surgery is big burdened technique until now.
- But after the era of BESS, the surgical treatment of deg. spine disorders comes to be simple, safe and less burden to the senile patients.
- It can overcome the approach limitation and working limitation of PELD using Docking technique.

BESS is also known under a different name, UBE(unilaterally biportal endoscopic spine surgery). BESS is developed as specialized for decompression-only so the portal position is closed to medial and distal. UBE, however, has final purpose of endoscope-assisted fusion so that it uses lateral and higher viewing portal to give a very best placed working portal for caging vertically and optimally into the disc space.

Portal position as starting point can change all endoscopic views and corridors into spinal canal. And it must conclude accessibility with minimal laminectomy and preservation of facet function, or fusion, necessity for mobile segments.

The Bess system is used worldwide but primaly is used within Asia countries such as Korea, where there is over 200 users of the BESS technique, but the numbers of users is rapidly growing. BESS will be a worldwide used system in the very near future, because its effectiveness and safety allows it to displace microscopic surgery for common degenerative spine disorders excepttumor resection, high thoracic surgery and deformity correction.

Curriculum Vitae

DAE-JUNG, CHOI. MD/PhD

Chairman of Himnaera Hospital, Pusan, Korea

85, Boemil-ro, Dong-gu, Busan, Korea, ZIP: 48735 Cellphone : +82-10-2994-8741 TEL: +82-1644-9502 FAX: +82-51-710-1505 E-mail: djchoi9@hanmail.net

Medical School Graduate:

Kyung-Hee Medical Univ. Seoul, South Korea

Seoul Sacred Heart General Hospital. Seoul, South Korea Residency: Orthopaedics

Medical School of Chung-Buk National Univ. Ph.D.: Medical Informatics and Management

2012~2018, Barun Hospital, Jinju, South Korea Chief Surgeon of Spine Center & International BESS Education Center

Chairman of Himnaera Hospital, 2018 ~ present

Best Paper Award

2017 KOSASS, Korean Society for the Advancement of Spine Surgery.

: Surgical Strategies of Extraforaminal approach for L5-S1 Foraminal Stenosis

2016 KOMISS, Korean Minimally Invasive Spine Surgery Society -Advanced Spinal Endoscopic Course Symposium and Cadaver Workshop-

: Technical strategies for L5-S1 foraminal approach of floating technique by endoscopic spine surgery

- 1. Schubert M, Hoogland T. Endoscopic transforaminal nucleotomy with foraminoplasty for lumbar disk herniation. *Oper Orthop Traum-tol* 2005;17:641-61.
- 2. Soliman HM. Irrigation endoscopic decompressive laminotomy: a new endoscopic approach for spinal stenosis decompression. *Spine J.* 2015;15:2282–9.
- 3. Kim SK, Kang SS, Hong YH, Park SW, Lee SC. Clinical comparison of unilateral biportal endoscopic technique versus open microdiscectomy for singlelevel lumbar discectomy: a multicenter, retrospective analysis. *J Orthop Surg Res.* 2018;13:22.
- Hwa Eum J, Hwa Heo D, Son SK, et al. Percutaneous biportal endoscopic decompression for lumbar spinal stenosis: a technical note and preliminary clinical results. J Neurosurg Spine 2016;24:602-7.
- 5. Heo DH, Son SK, Eum JH, Park CK. Fully endoscopic lumbar interbody fusion using a percutaneous unilateral biportal endoscopic technique: technical note and preliminary clinical results. *Neurosurg Focus*. 2017;43:E8.
- Kim JE, Choi DJ. Biportal Endoscopic transforaminal lumbar interbody fusion with arthroscopy. *Clin Orthop Surg.* 2018;10:248–52.
- Okuda S, Yamashita T, Matsumoto T, et al. Adjacent Segment Disease After Posterior Lumbar Interbody Fusion: A Case Series of 1000 Patients. *Global Spine J.* 2018 Oct; 8(7): 722–727.
- 8. Maragkos GA, Motiei-Langroudi R, Filippidis AS. Factors Predictive of Adjacent Segment Disease After Lumbar Spinal Fusion. *World Neurosurg.* 2020;133:e690-e694.

MAXMORESPINE BIPORTAL ENDOSCOPIC SPINE SYSTEM



The MaxMoreSpine Biportal system has been specially designed for minimally invasive spine surgery. Each instrument is designed for decompressing various pathology in the spinal canal and foramen with preserving facet stability. It is composed of different special instruments, one for curettes, chisels, dilator, hammer, dissector and small and rotational punches. Extra-set for fusion can be served for special customers, in which there are various retractors, such as root retractor, UV(universal)retractors and viewing portal retractors.

MAXMORESPINE BIPORTAL ENDOSCOPIC SPINE SYSTEM



Biportal Endoscopic Spine Surgery

Incision size : about 8~10mm Distance of the centers : about 20mm

8 mm

20 mm

INCHES 1

The MaxMoreSpine Biportal system

So there are three points to the system. The first good point: we can move the Endoscope freely and can view it from every angle. Second, through a certain space between the Endoscope and target anatomy, we can use and insert any instruments which are used in open spine surgery. This permits very familiar handling of instruments that aren't fragile. Third, through a certain gap, small bleeding can occur, which results in bad visibility however, with the MaxMoreSpine portal system, the bleeding and water are controlled, improving visibility.



Floating technique with a certain distance from the targeted anatomy

1. Portals

MaxMoreSpine Biportal Endoscopic spine system uses two portals or sometimes three. Portal position can be somewhat different, it depends on the surgeons and surgical purpose, Let's look into Dr. DJ Choi's style, and then you can make your desicion.



• **C-arm Positioning.** No tilting, no rotating. Straight down view. Skin marking on the border of the interlaminar space.

Portal Positioning

1. Standard portal (blue circles): Two portals are located at margins of the proximal and distal laminar border. About 1cm-sized skin incision is enough to make water output. The center of portals are apart about 2cm. This position is good for unilateral posterior lesions, i.e. discectomy for disc extrusion at the level of disc space or down-migrated sequestrated disc.

C-arm view

2. Lower portal (red circles): One portal is located at margin of the interlaminar space and the center of the other portal at 2 cm apart distally. Remnant skin interval between the portals is about 1cm or less. This position is better for severe spinal stenosis with narrower inter-laminar space, contralateral approach for bilateral central decompression, contralateral up-migrated disc, or contralateral foraminal decompression.



Portal positioning Lower portal(red circles) & Standard portal(blue circles)

2. Basecamp

• Scratching areas

1. Ipsilateral Posterior Approach(IPA)

Using a Muscle Dilator, scratch and detach basal muscle in the landing area of interlaminar space to expose bony surface margin to get orientation in "muscle forest". There are three bleeding foci on the dorsal lamina surface. Don't scratch on the dorsal lamina. Targeting area is only the interlaminar space. Soft landing on the proximal lamina margin(blue star), following the medial surface of the lamina, and distal lamina margin. Don't scratch red star area, 5 O'clock where heavy bleeding comes out.

2. Transforaminal Approach(TFA)

Landing on the transverse process(TP) and catch the distal half of the TP to expose bony surface from TP to accessory process to get orientation. The configuration of bony structural margin can give you right orientation. You can easily loose your way in microscopic view. IPA : Safe landing area is the interlaminar space on the posterior approach. Three bleeding foci (9, 7, and 5 O'clock directions)



TFA : Distal half of the transverse process is safe landing area on the transforaminal approach. Main bleeding focus is located at 9 O'clock direction.

3. Working Space



4. Making Enough Working Space

• Making enough working space

: Resecting 5mm-sized protruded margins of the proximal spinous process(SP) base and distal SP base.

Making 15mm-InterSP space is the key concept and skill to get enough working space for 8mm-wide sheath and a 5mm-wide instrument(chisel or punch). The first step is resecting distal part of proximal SP base and proximal protruded portion of distal SP base, which covering your view to contralateral side and blocking handling of instrument.

15 mm-interval

Proximal SP base Proximal SP base

Narrow interlaminar space.

Working space, enough with 15mm-interval

Enough working space

Distal SP base

Enough working space, 15mm, after resecting SP bases.

Distal SP

Distal

SP bas

1. Proximal SP base resection

Its small piece resection of protruded base in the middle of interlaminar space is enough to get working space and a view to contralateral side. Don't try to see its base in the center. Sometimes when you use a burr for this procedure, burr tip could break your scope lens. The optimal scoping view is that the base of proximal SP base should be located at "West Upper".

Straight Chisel

Proximal SP base is observed at the "West Upper" area. A Endoscope is located at a little lower and right side, so that there are somewhat free space for a straight chisel.

2. Distal SP base resection

Distal SP base resection is done with unilateral or bilateral distal laminectomy. With resecting this high prominence, any instrument could reach contralateral side without being disturbed by distal SP base.



WEST Upper

5. Laminectomy, Ipsilateral Upper Lamina

Laminectomy with preserving Facet stability

Decompression-only technique means that it will preserve structural stability of the Facet joint, which has propping mechanism between inferior articular process and superior one. To preserve it, laminectomy should be done only medial side of the high ridge (the highest line of the dorsal lamina, which divides dorsal surface and medial surface of the lamina). Medial surface resection is enough to expose ipsilateral SAP tip.



Propping mechanism of the Facet joint. Propping mechanism is served by supporting lateral side joint surfaces obliquely.

High ridge



Dorsal surface

Medial surface



High ridge

SAP tip

6. SAP tip resection, lpsilateral

SAP tip resection, ipsilateral

SAP tip on the ipsilateral side is nearly hidden under the upper lamina. So medial surface resection and 2mm proximal lamina resection are needed to expose SAP tip. However, it is not easily accessed or resected by a straight Kerrison Punch. Distal laminectomy until touching the medial surface of the pedicle can make a notch about 5mm, and then make a crack over the SAP tip using a hockey chisel, left sided.





Distal laminectomy and making a notch.





Making a crack running over the SAP tip using a Hockey Chisel.



Removing the fragmented SAP tip using Maximus Curette.

7. Laminectomy, Contralateral(CL) Upper Lamina

2mm Laminectomy from the ventral margin of the CL upper lamina

CL upper lamina resection line must be calculated from the ventral margin of the CL medial surface rather than high ridge. Resection at the high ridge on the CL upper lamina could result in more than half of the lamina. It is too much resection and useless. Only 2mm resection from the ventral margin can give an optimal view on SAP tip. 1st. resection using a Straight Chisel for SAP tip exposure. 2nd. proximal somewhat more resection using a Pedicle Chisel for CL foramen exposure.



Why SAP tip exposure and resection is important?

Exposing Ipsilateral and contralateral SAP tips is important to do foraminal decompression. Severe spinal stenosis is commonly combined with foraminal stenosis due to longer time of facet stress



Unilateral Posterior Approach and Bilateral Decompression with both Foraminotomy, SAP tip resection.

8. Contralateral(CL) SAP tip Resection

CL SAP tip resection for CL foraminotomy

SAP tip is resected by a Hockey Chisel, right-sided blade. During this procedure, deep layer of Ligamentum flavum should be preserved. It helps protecting the Dura and decreasing epidural bleeding with clear surgical view.





Making a notch using 2mm-Kerrison punch.



CL SAP tip resection using a Hockey Chisel, right-sided blade.

CL foraminotomy

SAP resection is mandatory to do foraminal decompression.







Posterior approach on the left side and accessing to CL side, central decompression and foraminal decompression with SAP tip(red colored area) resection on the right side.

9. Flavectomy, Deep Layer

Deep layer of Ligamentum Flavum, LF

Deep layer of LF should be preserved nearly finishing bony procedure. It serves as dural protector and prevent epidural bleeding coming out with clear surgical view.



Central Midline Structures

Under the epidural fat, dura is folded and makes central dural folding which looks similar to central fibrous band. Both of them, central dural fold and fibrous band should not injured as much as possible.





A Safe Way of Crossing the Midline

There are three layers of central midline portion. LF deep layer, Epidural fat, and Dura. The safe way of crossing the midline is between LF and epidural fat. Using a Bishop or Maximus, probing and detaching adhesion between LF and epidural fat and vascular layer can be done. Don't insert a sharp instrument under the epidural fat. It can make a central dural folding injury or epidural bleeding heavier and worse.



Three layers of the Central Midline.

A safe way between LF and Epidural fat layer(above), a wrong way between Epidural fat and Dura(below).

Main Roles of BESS Instruments

BESS Instrument	Main Role
Muscle Dilator	As a starter, skin and subcutaneous fascia release. As a muscle detacher, detaching basal muscle from the interlaminar space on posterior inter laminar approach or the transverse process on transforaminal approach.
Chisels	Straight, lateral- (Rt./Lt). and ventral-curved chisels forlaminectomy. sublaminectomy, subpediculotomy and endplate spur resection.
Curettes	3-7 mm sized -sized cup head with ventrally bended neck. Dissecting soft tissue, curetting and removing fragmented bone, flavectomy, and discectomy, probing a root. Bended neck permits accessing deeper and farther sublaminar space.
Discector	Arrow shaped knife for annulectomy





Article Code	Product Description
1001-ABR 5	Bone Curette 3.0 mm, Bishop
1001-ABR 6	Bone Curette 5.0 mm, Maximus
1001-ABR 7	Bone Curette 6.0 mm, Wang
1001-ABR 8	Reverse Curette 3.0 mm
1001-ABR 9	Boomerang Curette 3.0 mm



Article Code	Product Description
1001-CH 01	Straight Chisel 5.0 mm
1001-CH 02	Pedicle Chisel 4.0 mm
1001-CH 03	Hockey Chisel 5.0 mm, Right
1001-CH 04	Hockey Chisel 5.0 mm, Left





Article Code	Product Description
1001-DC 016	Target Serial Dilator SET (three components as one dilator)





Article Code	Product Description
1001-FE 001	Freer
1001-DC 004	Muscle Dilator
1001-AI 05	Indian Knife
1001-AI 001	Mallet
1001-IS 014	Тгау





Article Code	Product Description
1001-NRR 02	Root Retractor
1001-ES 14	Viewing Portal Retractor, Straight
1001-ES 17	Retractor (3 components as one UV retractor)
1001-ES 26	Viewing Portal Retractor, Curved





Article Code	Product Description
1001-RF 01-D	Micro Punch, 2.0mm, Straight
1001-RF 002	Micro Punch, 2.0mm, curved up





Article Code	Product Description
1001-EP 004	Foraminal Punch 2 mm
1001-EP 005	Foraminal Punch 3 mm





Article Code	Product Description
1001-EP 006	Rotational Punch shaft 2.0 mm
1001-EP 007	Rotational Punch shaft, 3.0 mm
1001-EP 002	Handle





Article Code	Product Description
30-0010-00	Arthroscope Ø 4 mm, l=175 mm, 0°, autoclavable
30-0011-00	Arthroscope Ø 4 mm, I=175 mm, 30°, autoclavable

Hoogland Spine Products GmbH | Feringastr. 4 D-85774 | Unterfoehring / Germany Tel +49 89 957 606 50 | Fax +49 89 957 606 52 | info@max-more.com | www.max-more.com



All instruments are patented. Reproduction of this catalogue without written permission is forbidden. HSP does not take any responsibility for clerical errors or wrong pictures. All pictures shown are for illustration purpose only. Actual products may vary due to product enhancement and may show optional extras. © Copyright Hoogland Spine Products GmbH.

VERSION 04-2023

www.max-more.com