

Movies illustration Percutaneous vertebroplasty set for easier and safer glue injection (RSNA 2001, ECR 2002)

1) Movie : Sterility constraints for vertebroplasty

Sterelite-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : This movie describes the sterility conditions under which vertebroplasty should be performed in order to avoid any septic complications.

2) Movie : Dual Guidance

Dual-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : This movie shows the dual guidance system of CT and fluoroscopy



Fig 23: Dual guidance CT



Fig 24: Dual guidance CT



Fig 25: Dual guidance fluoroscopy



Fig 26: Dual guidance fluoroscopy

3) **Movie : Local anesthesia**

Anesthesie-divx.avi Play movie (Divx mepg4 - .AVI)



Description : This movie shows local anesthesia of skin, subcutaneous layers, spinal muscles and periosteum along the pathway.

4) **Movie : Vertebral puncture case n°1**

Ponction-1-divx.avi Play movie (Divx mepg4 - .AVI)



Description : This movie illustrates vertebral puncture (transpedicular route) under dual guidance CT and fluoroscopy.



Fig 27: A short scalpel incision

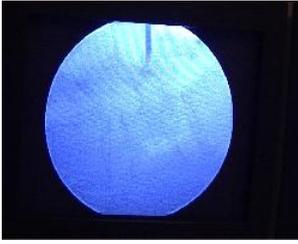


Fig 28: Vertebroplasty needle placement under fluoroscopy



Fig 29: CT control, transpedicular route, bevel facing the canal leading the course of the needle leftwards

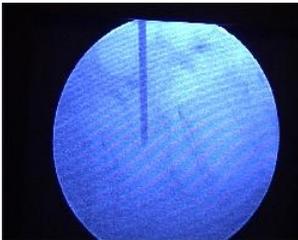


Fig 30: Vertebroplasty needle progression under fluoroscopy

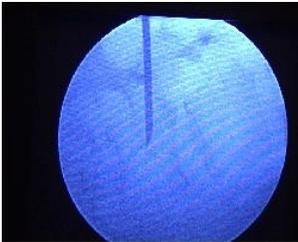


Fig 31: Needle bevel facing the upper vertebral plate leading the course of the needle downwards

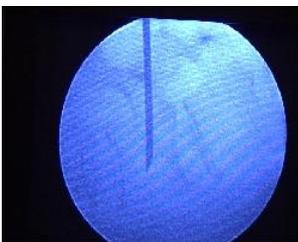


Fig 31: optimal course



Fig 33: CT control, optimal needle placement (anterior third of the vertebral body)

5) Movie : Vertebral puncture case n°2

Ponction-2-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : The movie describes the use of the vertebroplasty needle bevel. The aim of this bevel is to allow precise course correction of the needle inside bone tissue by changing the bevel direction (fig 34).

Hammering will lead the needle on the course determined by the bevel direction. According to the bevel tip direction (right, left, up or down) the course of the needle will be modified (fig 35 to 37 and 38 to 43). This technique allows an optimal placement of the vertebroplasty needle.

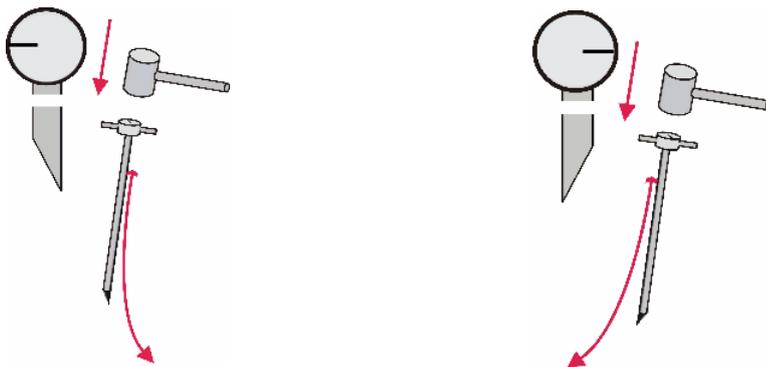


Fig 34: The principle of the vertebroplasty needle bevel

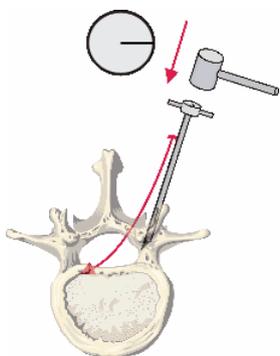


Fig 35: Bevel tip in medial position leading the course of the needle medially

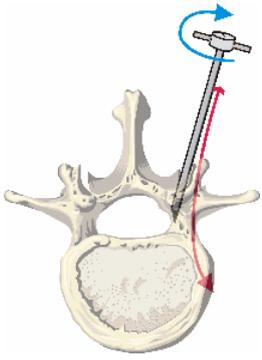


Fig 36: Change the bevel tip direction by turning the connector 180 °

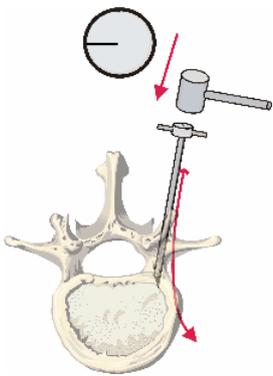


Fig 37: Course of needle corrected

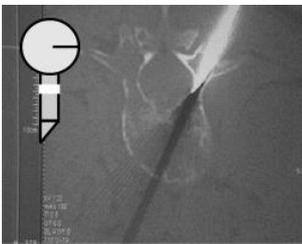


Fig 38: Bevel tip in medial position leading the course of the needle medially

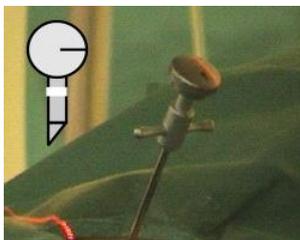


Fig 39: Turning the connector

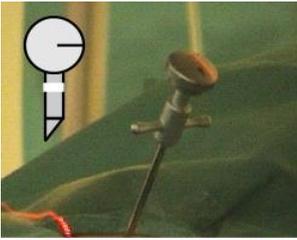


Fig 40: bevel tip in lateral position

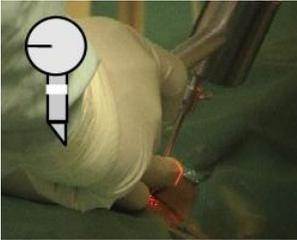


Fig 41: Hammering

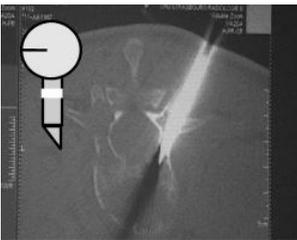


Fig 42: Needle course correction achieved



Fig 43: CT control, optimal needle placement reached

6) **Movie : Vertebral puncture n°3**

Vartebrography-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : After vertebral puncture the stylet of the needle is removed. If bleeding is observed a phlebogram should be performed.



Fig 44: No bleeding after removal of the stylet

7) Movie : Preparation of the cement

Prepciment-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : This movie illustrates cement preparation. A package of methyl methacrylate (Howmedica®, Microlok®, Palacos or Simplex®) low viscosity is composed of 20 g powder and 20 ml fluid monomer. The acrylic glue is obtained by mixing the two components. Then half of the glue is thrown away. 3g of tantalum are added to the mixture in order to increase the radiopacity of the cement.



Fig 45: Mixing 20 g of powder and 20 ml of fluid monomer



Fig 46: Half of the glue is thrown away



Fig 47: Addition of tantalum powder



Fig 48: Final mixture

8) **Movie : Injection of the cement n°1**

Injection-1-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : The movie shows cement injection under fluoroscopy control. In this case indication was osteoporosis ; optimal vertebral filling is required. A CT control is made at the end of the procedure.

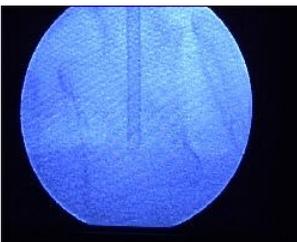


Fig 49: Vertebroplasty needle before filling



Fig 50: Cement injection with the pressure Cementoset (Optimed®)

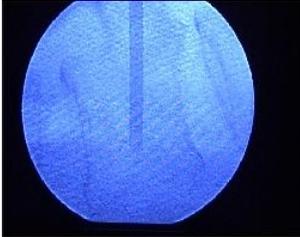


Fig 51: Glue progression inside the needle

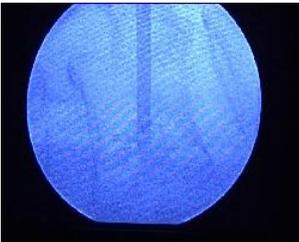


Fig 52: Early stage of vertebral filling

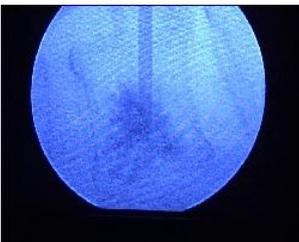


Fig 53: Progression of glue in vertebral body



Fig 54: Optimal filling



Fig 55: Reinsertion of the stylet before needle removal



Fig 56: Reinsertion of the stylet under fluoroscopy control



Fig 57: Stylet in position



Fig 58: The needle is then carefully removed



Fig 59: CT control, optimal glue filling, no complications

9) **Movie : Injection of the cement n°2**

Injection-2-divx.avi Play movie (Divx mepg4 - .AVI) 

Description : The movie shows cement injection under fluoroscopy control. In this case the indication is metastasis and a low volume of cement is sufficient (2-3 ml). Before starting the injection of the glue a reference picture of the vertebral body is fixed on the right monitor, thus allowing better estimation of the filling and a quicker diagnosis of eventual leaks.



Fig 60: Fluoroscopy monitors with the reference image



Fig 61: Vertebroplasty needle in position



Fig 62: Light is switched off during the injection for better visualization



Fig 63: Early stage of vertebral filling



Fig 64: Injection completed (in metastasis a low volume is sufficient)



Fig 65: Reinsertion of the stylet before needle removal



Fig 66: Stylet in position



Fig 67: The needle is then carefully removed



Fig 68: CT control

10) Movie : Vertebroplasty Optimed set n°1

vertebro-set-1-mepg4.avi Play movie (Divx mepg4 - .AVI)



Description : Vertebroplasty performed in a patient with severe osteoporosis with vertebral collapse



Fig 69: Cemento®set prepared for aspiration of the cement with the special cannula.



Fig 70 : Cement aspirated directly in the syringe.



Fig 71: Injection of the cement under fluoroscopy control.



Fig 72: The cemento® is removed and the stylet of the cemento needle is reinserted under fluoroscopy control.



Fig 73: The cemento® is removed and the stylet of the cemento needle is reinserted under fluoroscopy control.



Fig 74: Control CT scan after the procedure

11) Movie : Vertebroplasy Optimed set n°2

vertebro-set-2-mepg4.avi Play movie (Divx mepg4 - .AVI) 

Description : Cemento®set prepared for aspiration of the cement with the special cannula.



Fig 75: Cement aspirated directly in the syringe.



Fig 76: Cement aspirated directly in the syringe.



Fig 77: Injection of viscous glue with the screw system.



Fig 78: The injection is monitored by fluoroscopy.



Fig 79: The needle is removed with the help of the metal wings



Fig 80: Fluoroscopy monitors with the reference image



Fig 81: CT control

12) Movie : Vertebroplasty Optimed set n°3

vertebro-set-3-mepg4.avi Play movie (Divx mepg4 - .AVI)



Description : Percutaneous vertebroplasty: Vertebral collapse in osteoporosis.



Fig 82: Needle positioned in the anterior part of the vertebral body.



Fig 83: Aspiration of the cement in the Cemento® gun.



Fig 84: Cemento® gun attached to the needle.



Fig 85: Injection with the screw system under fluoroscopy.



Fig 86: Continuous injection of viscous cement.



Fig 87: Reinsertion of the stylet monitored by fluoroscopy.



Fig 88: Good packing of the vertebral body.

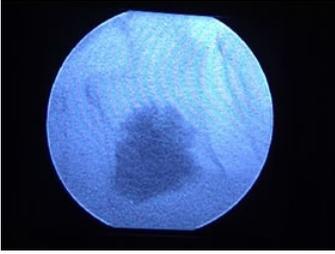


Fig 89: Good packing of the vertebral body.

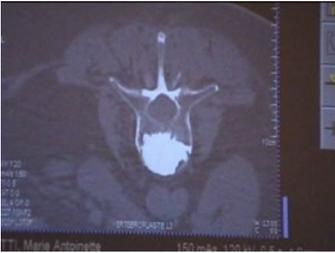


Fig 90: Good packing of the vertebral body.