

Osteoarthritis Protocol

The screenshot displays the BIOQUANT OSTEO software interface. The main window shows a histological image of a bone section with yellow and red regions. The software interface includes various toolbars, a 'Data' window with 'Available Arrays' and 'Selected' lists, and a 'Measurement' window with a 'Calculate' table.

Available Arrays:

- D4 Epiphyseal Bone Volume (1)
- D5 Trabecular Tissue Volume (0)
- D6 Trabecular Bone Volume (0)
- D7 Subchondral Plate Volume (0)
- L1 Epiphyseal Bone Surface (1)
- L2 Trabecular Bone Surface (0)
- L3 Subchondral Bone Plate Surface (0)
- L4 Articular Bone Plate Width (0)

Selected: L1, L2, L3

Measurement Window:

File	Data	Update		
A	B	C	D	E
P1 Ep.TV	15.41			
P2 Ep.BV	7.96			
P3 Ep.BV/Ep.TV	0.52			
P4 Tb.TV	0.00			
P5 Tb.BV	0.00			
P6 Tb.BS	0.00			
P7 Tb.Dm (Rod)	0.00			
P8 Tb.N (Rod)	0.00			
P9 Tb.Sp (Rod)	-0.00			
P10 Sb.Pl.Th	0.00			

The Referent Data Tool has been used to simultaneously measure the epiphyseal TV, BV, and BS.

Get Image of TV

Up to **4 GB Scan** of Section:

- Scans can be generated manually by BIOQUANT OSTEO, automatically by BIOQUANT SCAN, or via a third party slide scanner.
- In BIOQUANT, zoom out so the TV fits in one field of view.

Live Image from Microscope with Camera:

- In BIOQUANT, see a live image of the tissue directly in the Image Window at a low objective like 4X or 2X.
- The TV does not have to fit in one field of view.

Define Epiphyseal Tissue Volume

Draw the boundary of the epiphyseal tissue volume in the Image window.

Irregular TV Tool

Makes it easy to define the outer epiphyseal tissue volume containing all the bone distal to the articular cartilage and proximal of the growth plate, including the cortical shell.

Referent Data Tool for All Bone

Click **Preview** to automatically:

- Threshold the **epiphyseal** bone by color
- Fill in small holes and cracks
- Preserve void spaces
- Trace the bone

Use **Thresholding Editing** tools like Draw, Erase, Clean, Erode/Dilate to refine the **epiphyseal** bone threshold, if necessary.

Click **Measure** to simultaneously record:

- Ep.TV, Ep.BV, Ep.BS
- Ep.BV/Ep.TV

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The Auto Width Tool has been used to collect plate area, bone-cartilage interface length, and plate thickness.

File	Data	Update		
A	B	C	D	E
P1	Ep.TV	15.41		
P2	Ep.BV	7.96		
P3	Ep.BV/Ep.TV	0.52		
P4	Tb.TV	9.95		
P5	Tb.BV	3.73		
P6	Tb.BS	46.62		
P7	Tb.Dm (Rod)	186.20		
P8	Tb.N (Rod)	3.76		
P9	Tb.Sp (Rod)	79.79		
P10	Sb.Pl.Th	0.00		

Define Trabecular Tissue Volume

Draw the boundary of the trabecular tissue volume in the Image window.

Irregular TV Tool

Makes it easy to define the "trabecular tissue volume" that contains only epiphyseal trabecular bone, excluding the cortical shell, subchondral bone plate, and bone proximal to the growth plate.

Referent Data Tool for Trabecular Bone Only

With the bone structure now restricted to the trabecular compartment, click **Preview** to automatically:

- Retrieve the edited threshold from the previous step.
- Trace the bone

Click **Measure** to simultaneously record:

- Tb.TV, Tb.BV, Tb.BS
- Tb.BV/Tb.TV, Tb.BS/Tb.BV
- Tb.N, Tb.Dm, Tb.Sp.

Use the Auto Width Tool

With the **Keep Tool**, you mark the subchondral plate. BIOQUANT removes the rest of the trabecular bone structure.

Using the **Auto Width Tool**, BIOQUANT collects these data simultaneously:

- Subchondral Plate area
- Bone-cartilage interface length
- Subchondral Plate thickness every 50 microns

This is a sample protocol. It is easily modified for different animals, tissues, embedding methods, and stains. All parameters can be renamed. New calculations can be added. Both live imaging and scans are supported. Measure at the magnification that is best for your histology. Find out more: www.bioquant.com/osteo