7. Veterinary Measurement

This chapter explains about the composition and functions of veterinary measurement.
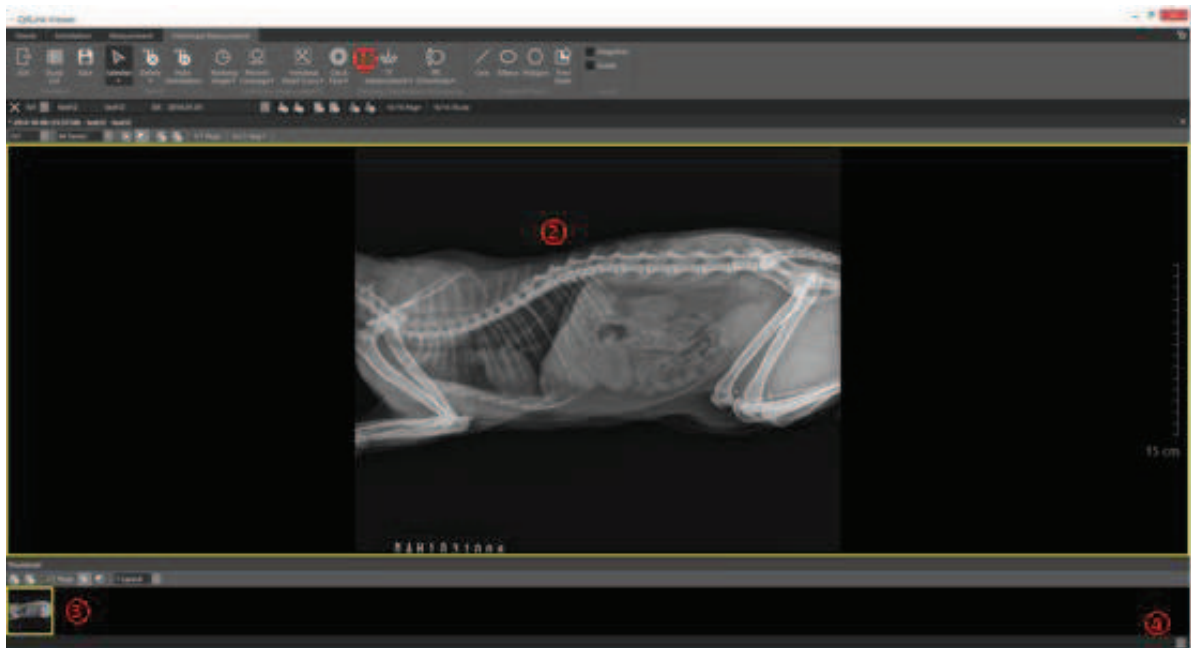
Composition of Veterinary Measurement

Veterinary Measurement Tools

Dynamic Stabilization Procedures

Fragment Tools

## 7.1 Composition of Veterinary Measurement

No.	Function
1	**Image Adjustment Tools**
2	**Study Viewer**
3	**Thumbnail**
4	**Status Bar**

7.2   Veterinary Measurement Tools

7.2.1   Norberg Angle

Image	Function
	Diagnoses the problem with formation in an animal's (esp. canine) hip joint.

1 Open the image of pelvis in ventrodorsal view.

2 Click on the **Norberge Angle** button from the toolbar and move a mouse pointer to the image view.

3 Click a mouse button three times on the left femoral region (right side of a patient) to make a circle around the edge of a femur.

4 Apply the same procedure (step 3) to the right femur again. Then a segment connecting the center of two circles is created.

5 Click each end point of the straight line to make the segment pass an outermost point of the left/right acetabulm. Then the angle is calculated and indicated.
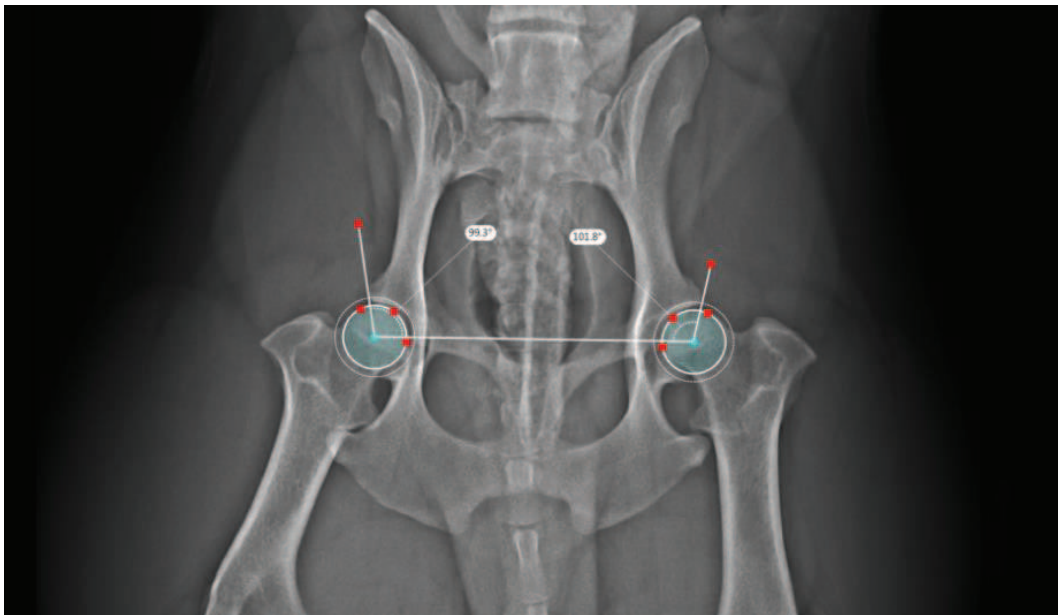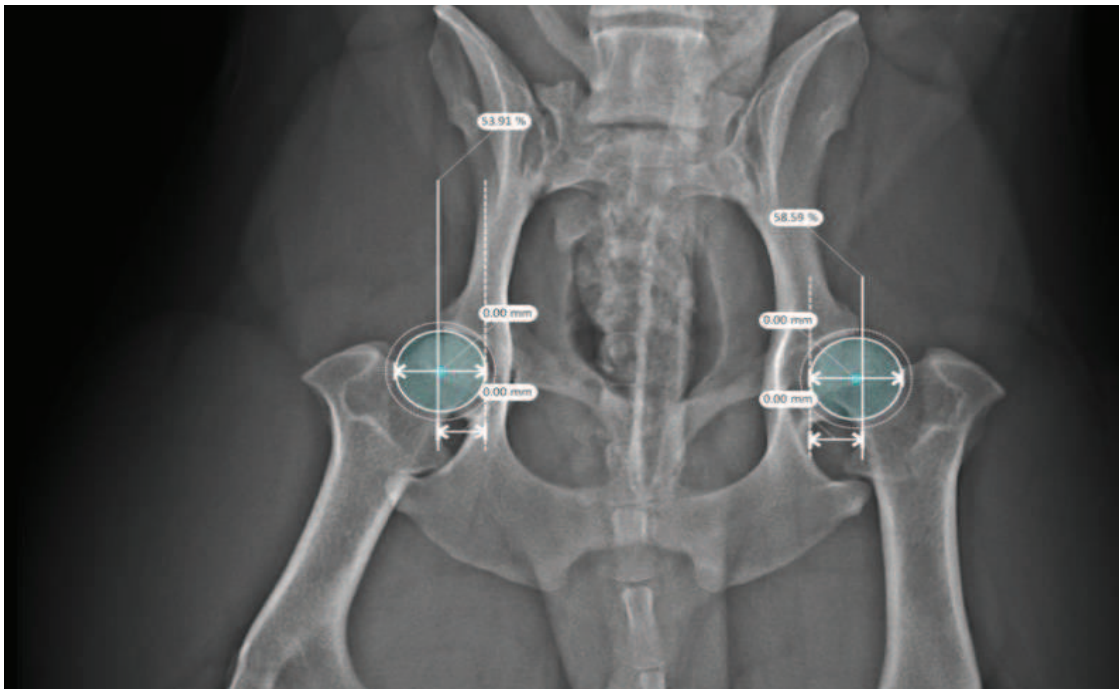

• Click ▾ button of the **Norberge Angle** menu and choose **Template** to show a template and sample of an angle as the image above. Drag each point or a template with a mouse button to calculate diameter and scope again. Then the analysis results are indicated automatically.

7.2.2 Percent Coverage

Image	Function
⬚	Diagnoses the problem with formation in an animal's hip joint.

1 Open the image of pelvis in ventrodorsal view.

2 Click on the **Percent Coverage** button from the toolbar and move a mouse pointer to the image view.

3 Click a mouse button three times on the left femoral region (right side of a patient) to make a circle around the edge of a femur.

4 Move a mouse cursor and click a point where you want to compare. Then a segment line with the outer edge of a circle (created from step 3) is indicated. After that, the length of a segment in comparison with the diameter of a circle is measured.

5 Apply the same procedure (step 4) to the right femur again.

> • Click ▾ button of the **Percent Coverage** menu and choose **Template** to show a template and sample of an angle as the image above. Drag each point or a template with a mouse button to calculate diameter and scope again. Then the analysis results are indicated automatically.

7.2.3 Vertebral Heart Score

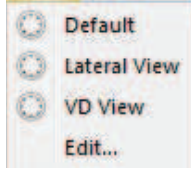| Image	Function
⊠	Diagnoses the heart size of animals (A dog or a cat).

1 Open the image of lateral thoracic.

2 Click on the **Vertebral Heart Score** button from the toolbar and move a mouse pointer to the image view.

3 Set a point by clicking the starting point of the 4th thoracic spine and the end point of the the 9th thoracic spine.

4 Click the highest and bottom point of a heart to make the longest axis lengthwise.

5 Click the left end and the right end points of a heart to make the longest axis widthwise.

6 The value of Vertebral Heart Score (VHS) is calculated and displayed automatically.
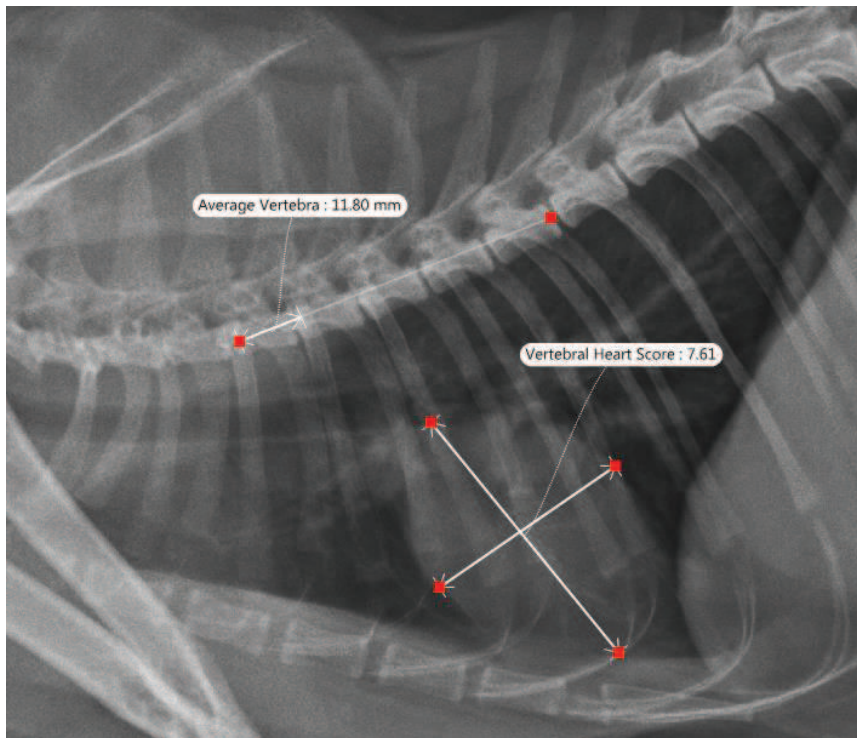
> • Click ▾ button of the **Vertebral Heart Score** menu and choose **Template** to show a template and sample value as the image above. Drag each point or a template with a mouse button to determine the measuring site. Then the analysis results are indicated automatically.

7.2.4 Clock Face

Image	Function
	Indicates the anatomical information of vertebrate hearts.

|	Menu	Function
	Default	Default value (based on the image in ventrodorsal view.)
	Lateral View	Indicates the anatomical information of vertebrate hearts if the image is in lateral view.
	VD View	Indicates the anatomical information of vertebrate hearts if the image is in ventrodorsal view.
	Edit...	Changes the setting value of Lateral View and VD View. Adds a new clock face.

1 Open the lateral image or the image in ventrodorsal view.

2 Click ⏷ button of **Clock Face** and select the submenu. Then a template and sample values set prevouisly are indicated.

3 Click a point in the direction of 12 o'clock and another in the direction of 6 o'clock. Then a clock-shaped circle and the anatomical information of the relevant direction are indicated.

- You can add or change the setting value depending on the species.
- The default setting value is based on a small dog.

Default

The anatomical structure of animal heart is indicated by clock-shaped templates only.
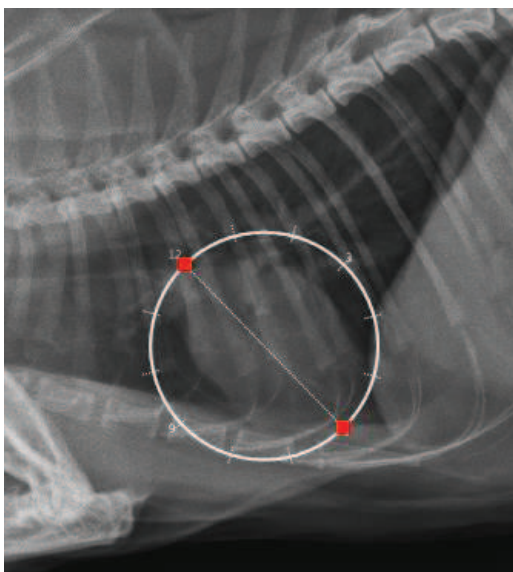
Lateral View

Templates to indicate the anatomical structure of animal hearts in a clockwise direction.

Name	Direction
Main Artery	11-1 o'clock
Pulmonary Artery	1-2 o'clock
Left Auricle	2-3 o'clock
Left Ventricle	3-5 o'clock
Right Ventricle	5-9 o'clock
Right Auricle, Aortic Arch, Pulmonary Trunk	9-11 o'clock

VD View

Diagnose the vertebrate hearts by indicating its anatomical information in a clockwise direction.

Name	Direction
Main Artery	11-1 o'clock
Left Auricle	2-3 o'clock
Left Ventricle	3-6 o'clock
Right Ventricle	6-9 o'clock
Right Atrium	9-11 o'clock

7.3 Dynamic Stabilization Procedures

7.3.1 TT Advancement (TTA)

| Image	Function
	To prevent anterior cruciate ligament rupture of a decrepit or obese dog, acquires the information about TTA (Tibial Tuberosity Advancement) before deciding to operate it.

Menu	Function
Template for Right	A pre-designated template to the right leg.
Template for Left	A pre-designated template to the left leg.

> • Click a newly-generated template with a right mouse button and choose **Save as Templete (Right)** or **Save as Templete (Left)** to make the tool as a template.

1 Open the leteral image of a knee.
2 Click on the **TT Advancement** button from the toolbar and move a mouse pointer to the image view.
3 Click three points along the edge of condyles of the fermur to create a circle nearest to the condyles of the fermur.
4 Click three points along the edge of condyles of the tibia to create a circle nearest to the condyles of the tibia.
5 Draw a line from the side of patellar tendon to the point of tibial crest.
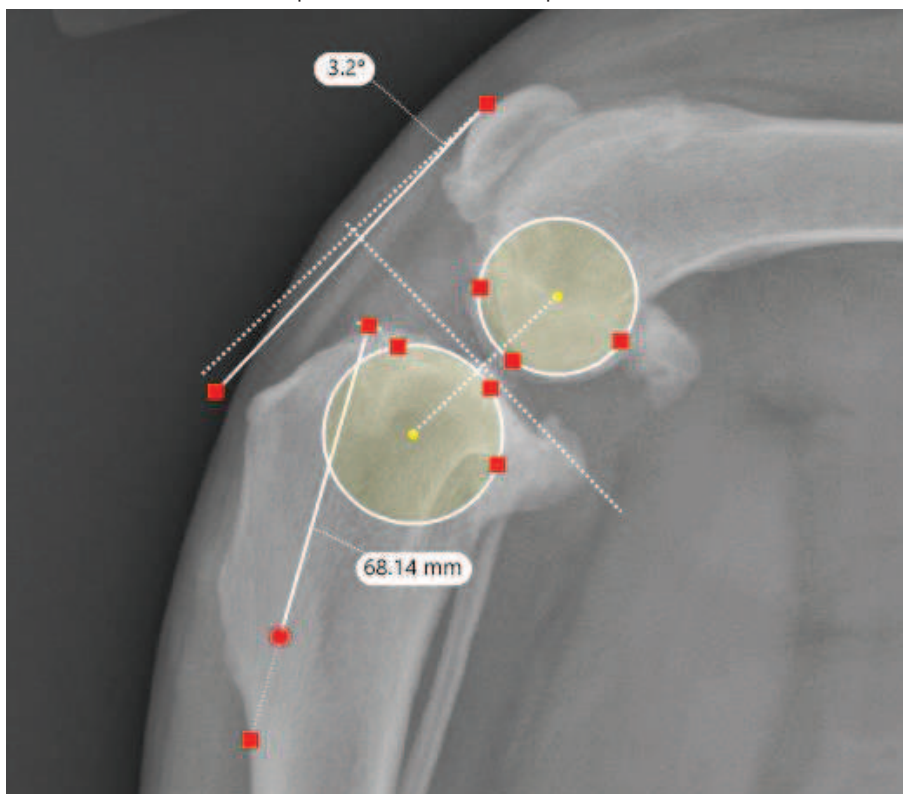
6 Click both endpoints of the tibia to be cut and draw a segment as the image below.

7 Click a right mouse button and choose **Move Fragment** to preview the operation results such as the incision length and the angle after the incision based on the marked line of the cutting line.

7.3.2 TPL Osteotomy (TPLO)

| Image	Function
(icon)	To prevent anterior cruciate ligament rupture of a decrepit or obese dog, acquires the information about TPLO (Tibial Plateau Leveling Osteotomy) before deciding to operate it.

Menu	Function
Template for Right	A pre-designated template to the right leg.
Template for Left	A pre-designated template to the left leg.

(icon)	Click a new generating tool with a right mouse button and choose **Save asTemplete (Right)** or **Save as Templete (Left)** to make the tool as a template.

1 Open the lateral image of knee.
2 Click on the **TPL Osteotomy** button and move a mouse pointer to the image view.
3 Set a vertical line passing the tibial plateau.
4 Set a line from the center in condyles of the femur to the center in a talus along the tibial axis.
5 A circle displays to indicate the size of saw blade around the point where the two lines are crossed.
6 Move a mouse cursor around the circle and check the size of saw blade and a part of tibia to be cut. After that, click a mouse button.
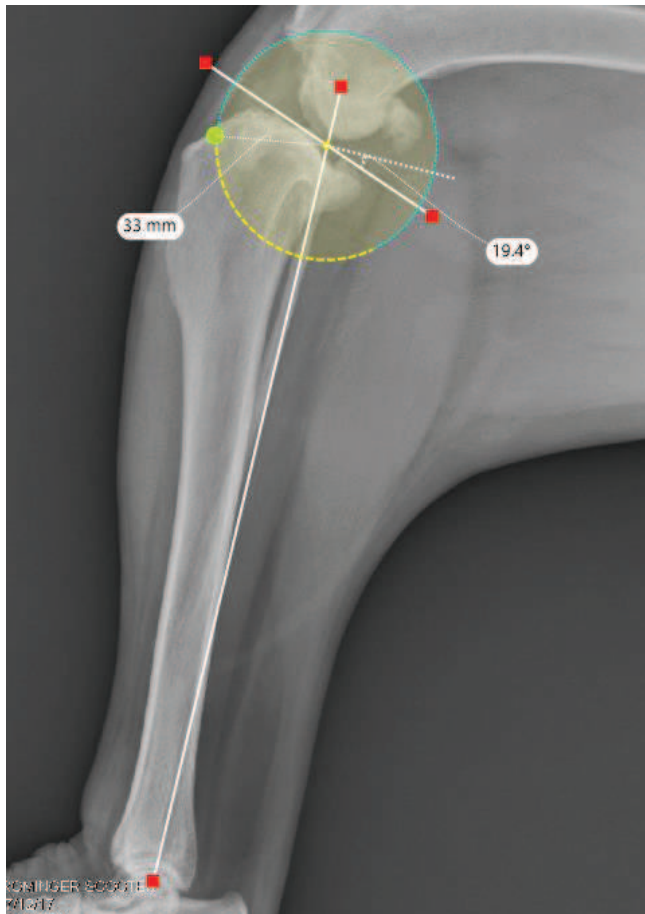
- Click ▾ button of the **TPL Osteotomy** menu and choose **Template** to show a template and sample value as the image above. Drag each point or a template with a mouse button to determine the measuring site. Then the analysis results are indicated automatically.
- The size of saw blade is adjusted in fixed sizes.
  - 12mm/ 15mm/ 18mm/ 21mm/ 24mm/ 27mm/ 30mm / 33mm / 36mm / 39mm / 42mm)

7 Click a right mouse button and click **Rotate Saw Blade** to view the expected results of operation in advance.
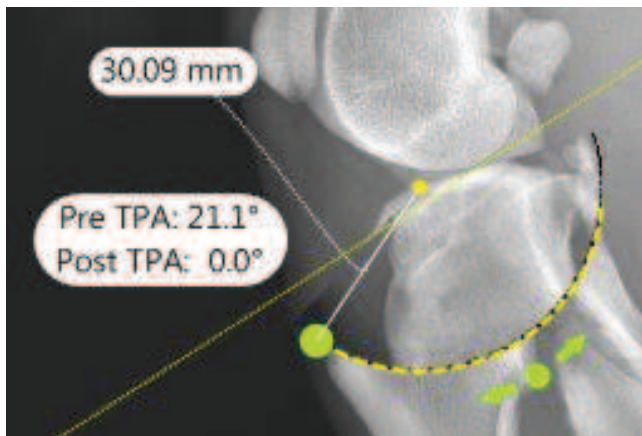

8 Adjust Post TPA by moving the yellow-green point at the bottom of the saw blade (a dotted line in yellow).

Additional functions (by clicking a right mouse button)

Menu	Function
Show Saw Blade	Sets whether to display a circle which shows the size of saw blade.
Lock to Centor	Fixes the middle of a circle as an intersection of the two segment lines.
Lock Saw Size	Fixes the size of a circle which shows the area of a saw blade.
Rotate Saw Blade	Indicates result of the surgical site rotated to the expected angle in advance.

- The way of appointing the center of talus is as follows.
  - Click ⚙ on the right top of **QXLink Viewer** screen to move to **Setting**.
  - Move to **Style > Dynamic Stabilization Procedures**.
  - Choose **Yes** from **Use Circle Shape of Astragalus Bone**, and click **OK** button to close the **Setting** dialog. After that, restart **QXLink Viewer**.
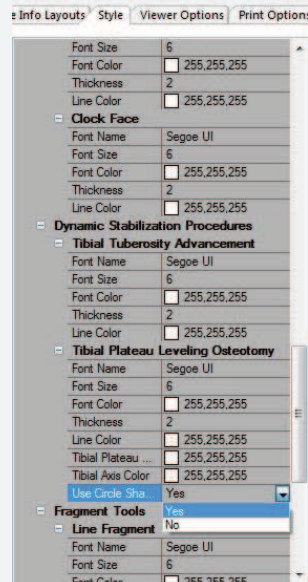
  - Appoint the center of condyles of the femur, and select two points on the center of talus.
  - When a circle dispalys, select another point to appoint the center of talus accurately.
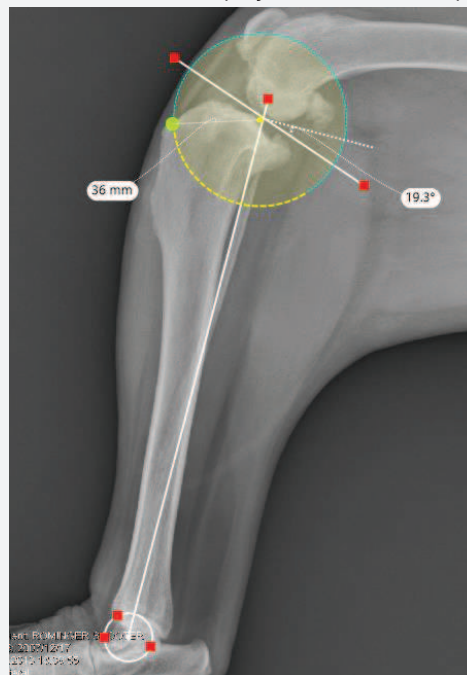
7.4   Fragment Tools

Fragment tool is the virtual surgical instruments used for cutting a bone in the image into desired form.

7.4.1   Line

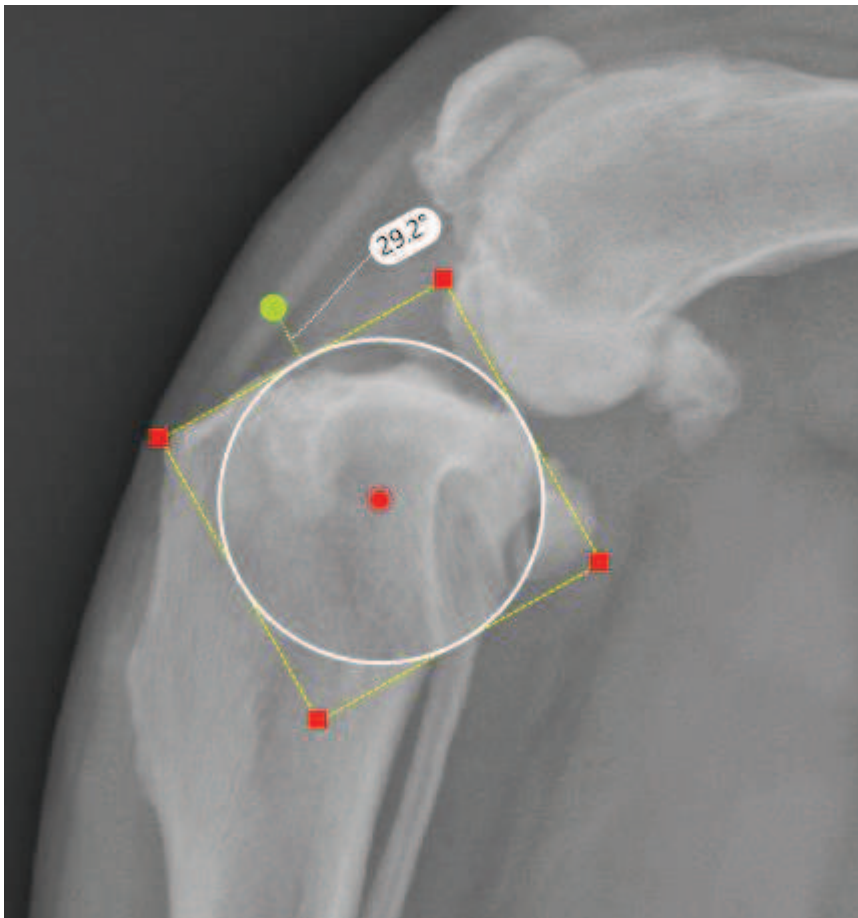| Image	Function
	Cuts a bone in the image in a straight line and check the cutting part.

1 Choose **Line**.

2 Click the starting point and end point of incision to create a cutting line.

3 Press the **ESC** key or click on **Selector**.

4 Move a mouse pointer while clicking a yellow-green point to adjust the angle.

5 Move a mouse pointer while clicking a red point (circle) on the cutting line to adjust the center of the incision.

7.4.2 Ellipse

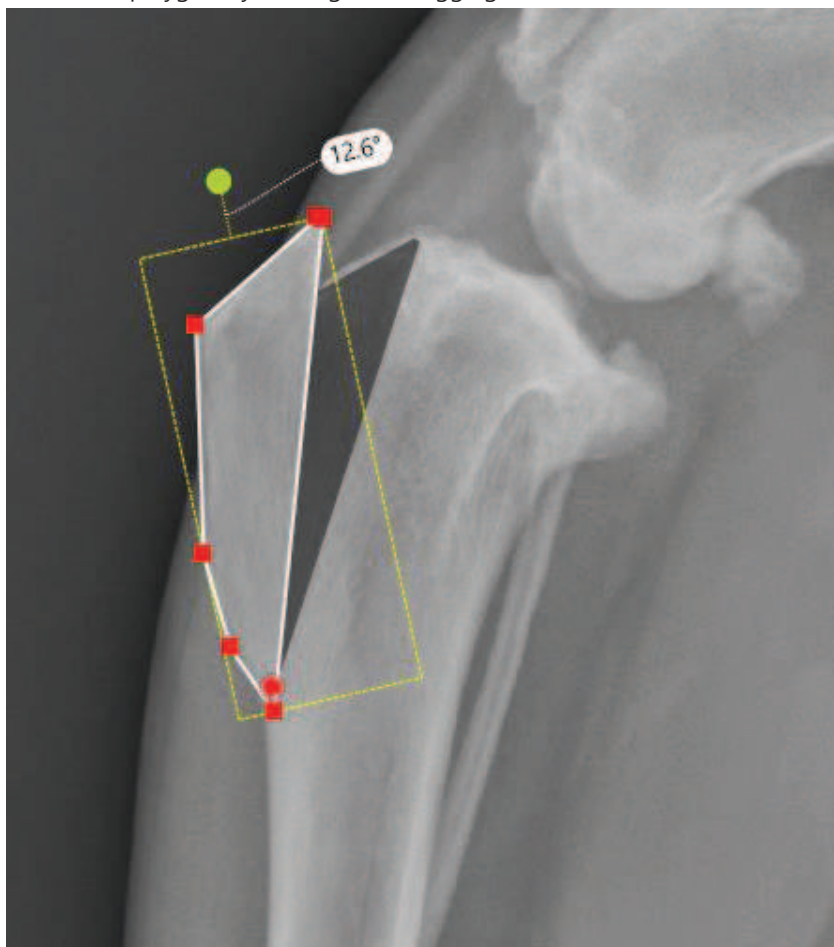| Image	Function
	Cuts a bone in the image as an ellipse shape and check the cutting part.

1 Choose **Ellipse**.

2 Click and drag a mouse button in the desired position and click again to draw an ellipse.

3 Press the **ESC** key or click on **Selector**.

4 Move the center of an ellipse with a mouse button while clicking the red point.

5 Rotate an ellipse by dragging a mouse button while the green point.

6 Or, move an ellipse by clicking and dragging a mouse button.

7.4.3 Polygon

Image	Function
	Cuts a bone in the image as a polyon shape and check the cutting part.

1 Choose **Polygon**.

2 Click a mouse button on the desired position and draw a polygon by dragging a mouse button several times.

3 Double click a mouse button to complete drawing a polygon.

4 Press the **ESC** key or click on **Selector**.

5 Move a centeral point of rotation by moving a red point in the polygon with a mouse button.

6 Rotate the polygon by clicking and dragging a green point with a mouse button.

7 Or, move the polygon by clicking and dragging a mouse button.

7.4.4 Free Draw

Image	Function
	Cuts a bone in the image as a desired shape and check the cutting part.

1 Choose **Free Draw**.

2 Click a mouse button on any position of the image and draw a figure as a desired shape by dragging a mouse button.

3 Press the **ESC** key or click on **Selector**.

4 Set a centural point of rotation by moving a red point in the figure with a mouse button.

5 Rotate the figure by clicking and dragging a green point with a mouse button

6 Or, move the figure by clicking and dragging a mouse button.