Creating Customized Segments for Preferred Angles and Postural Score

The goal is to group segments on the upper body (including the spine and the head). This creates a new segment for the Postural Score analysis. This will give more flexibility for analyzing the posture of the trunk.

The general concept is to provide a tool that will allow you to create virtual segments (Segments) of the pelvis, trunk, neck and head on which you will be able to edit preferred angles with a score.

You can analyze the back load to prevent worker's injuries and to improve productivity in the manufacturing processes. There are many ways or systems for evaluating human postures. The analysis of the trunk posture could be based, for example, on the following bending angle.

This can be recorded during a simulation and exported for analysis.
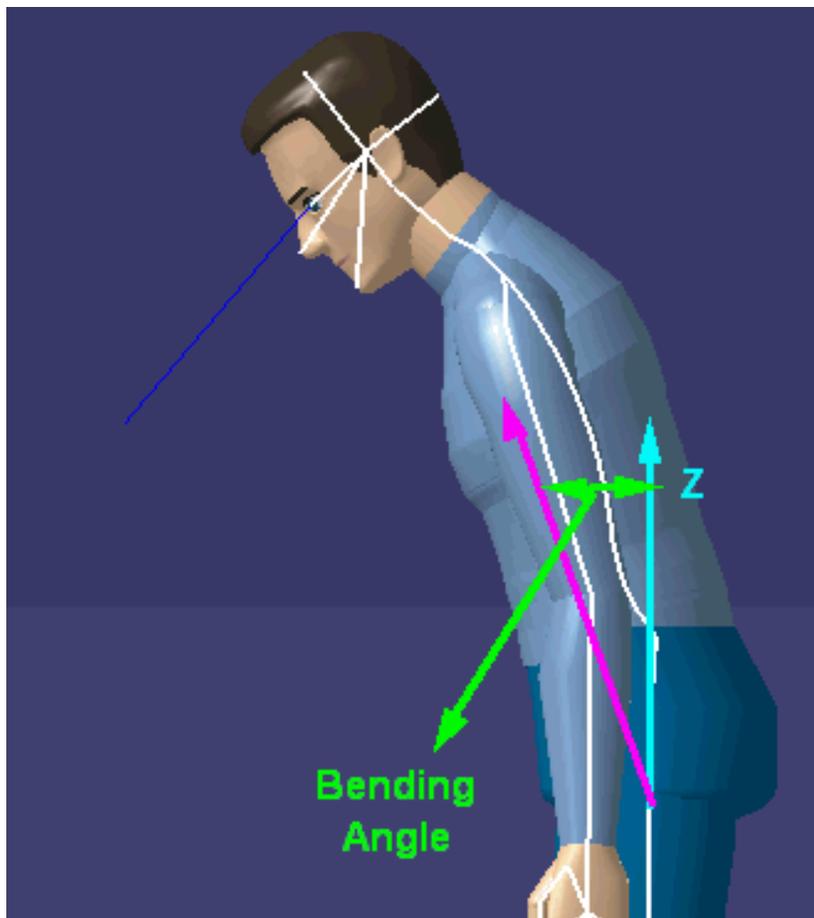
To do this, create virtual segments (Segments) by selecting two manikin's segments. This Segment will have a calculated Range of Motion (ROM) based on the ROM of each segment of the pelvis, trunk, neck and head (central segments as we will call them in the rest of this document), included between the two selections. These virtual Segments can be created for any Degree of Freedom (DOF). Then, you will be allowed to specify standard Preferred Angles with a score and, by the same way, analyze the posture using the **Postural Score** panel.

1. Select the **Customized Segment** from the **Angular Limitations** toolbar.

2. The dialog box appears without any existing customized Segment selected. So, you can either select an existing one that was previously created, or create a new one.
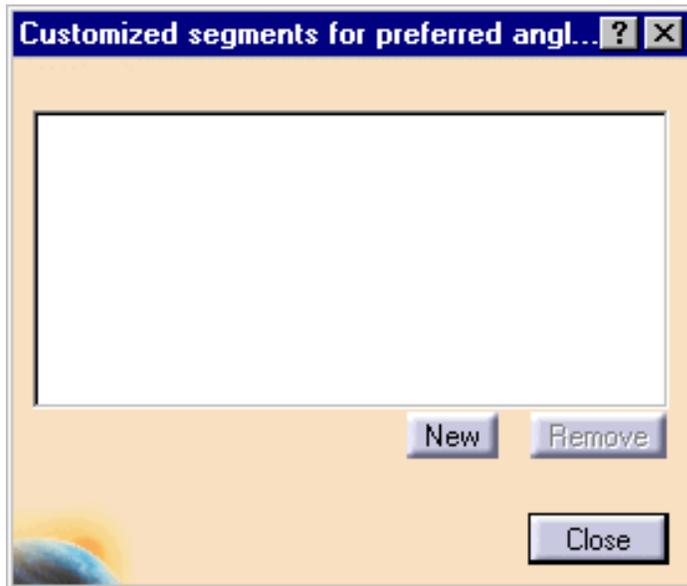

3. To create a new customized Segment, select **New**.

4. The command prompt asks "**please select the first segment to which the joint will be attached**". Select the required segment.

5. The command prompt asks for a **second segment**, select the required segment.

6. The data appears in the dialog box, and the angle appears on the manikin.

-1.802 Deg

180.000 Deg

Customized segments for preferred ...

Transpelvic/Lumbar1

New   Remove

Close
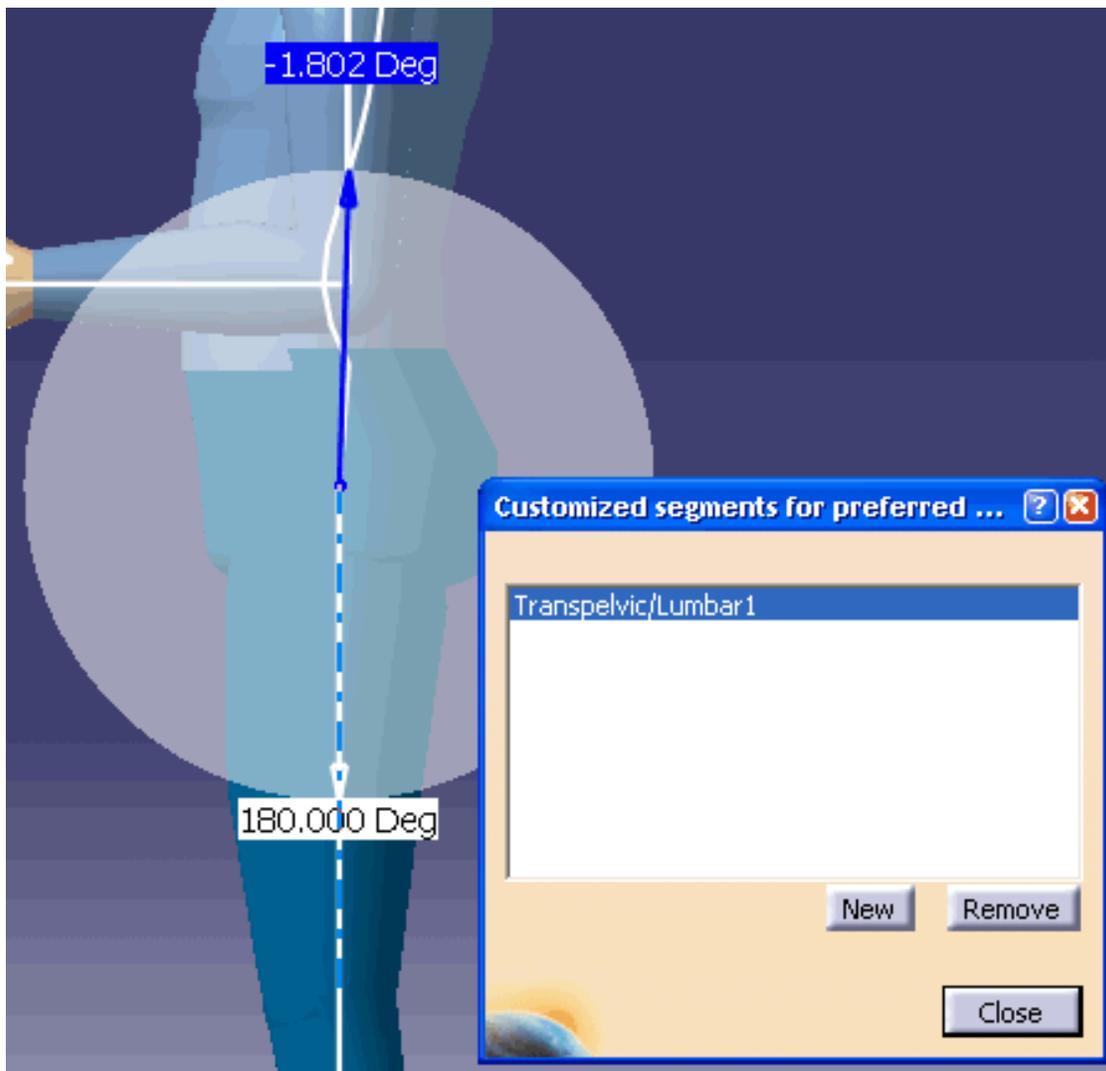
7. Select the **Customized Segment** to activate the Segment in the 3D Geometry window.

8. Right-click in the shaded area to access the Contextual window.
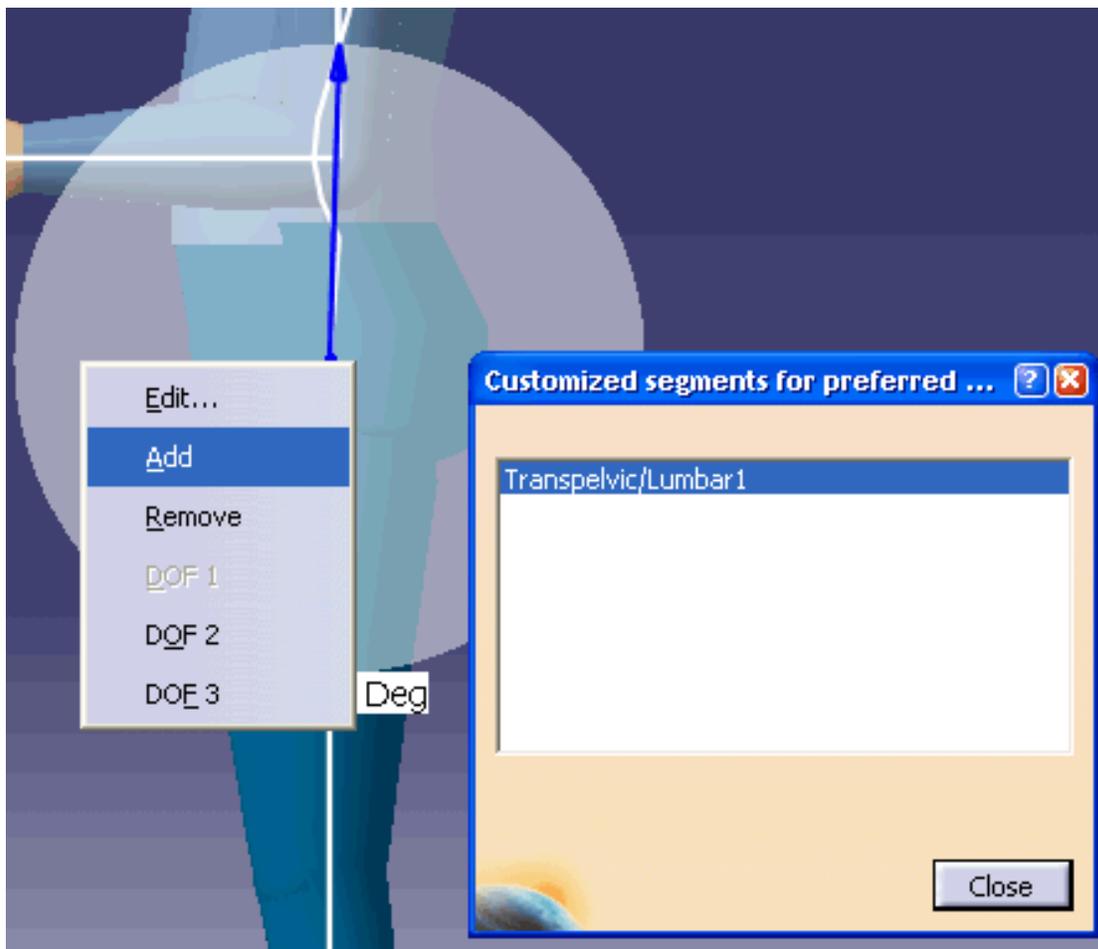
9. Select **Add** to create the preferred angles. (Don't forget to put in a score number (1-10)). You will be able to add **Preferred Angles** by using the current contextual menu command. The following dialog box will also pop-up allowing you to edit the zones. This dialog is exactly the same one that you will find on the standard segments (Segments). The **Body Element** field will show which segments are the reference of the customized Segment.

Preferred angles   ? ✕

Body Element: Transpelvic/Lumbar1
Degree Of Freedom: Flexion/Extension
Mode: Default

Name: Pref.Angle_1

Color: [green] ▼   Score: 10 ⬍

Minimum limit: 0deg   ⬍   50   %

Maximum limit: 180deg   ⬍   100 %

|◀   ◀   ▶   ▶|

Close

-1.802 Deg
0.000 Deg

180.000 Deg

Customized segments for preferred ... ? ✕

Transpelvic/Lumbar1

New   Remove
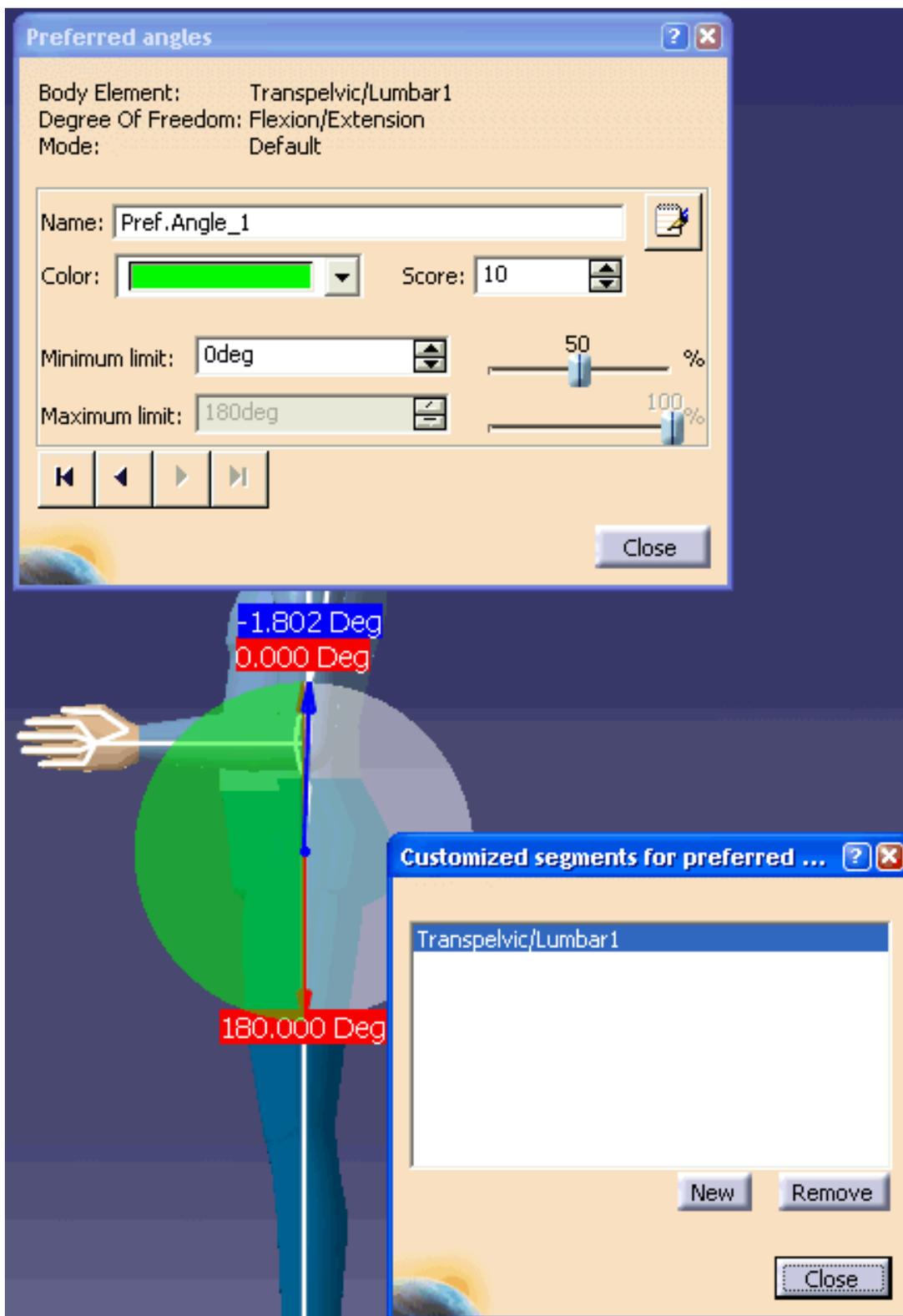
Close

10. Add required amount of customized segments by using the **Close**, and selecting **Add** again from the contextual window.
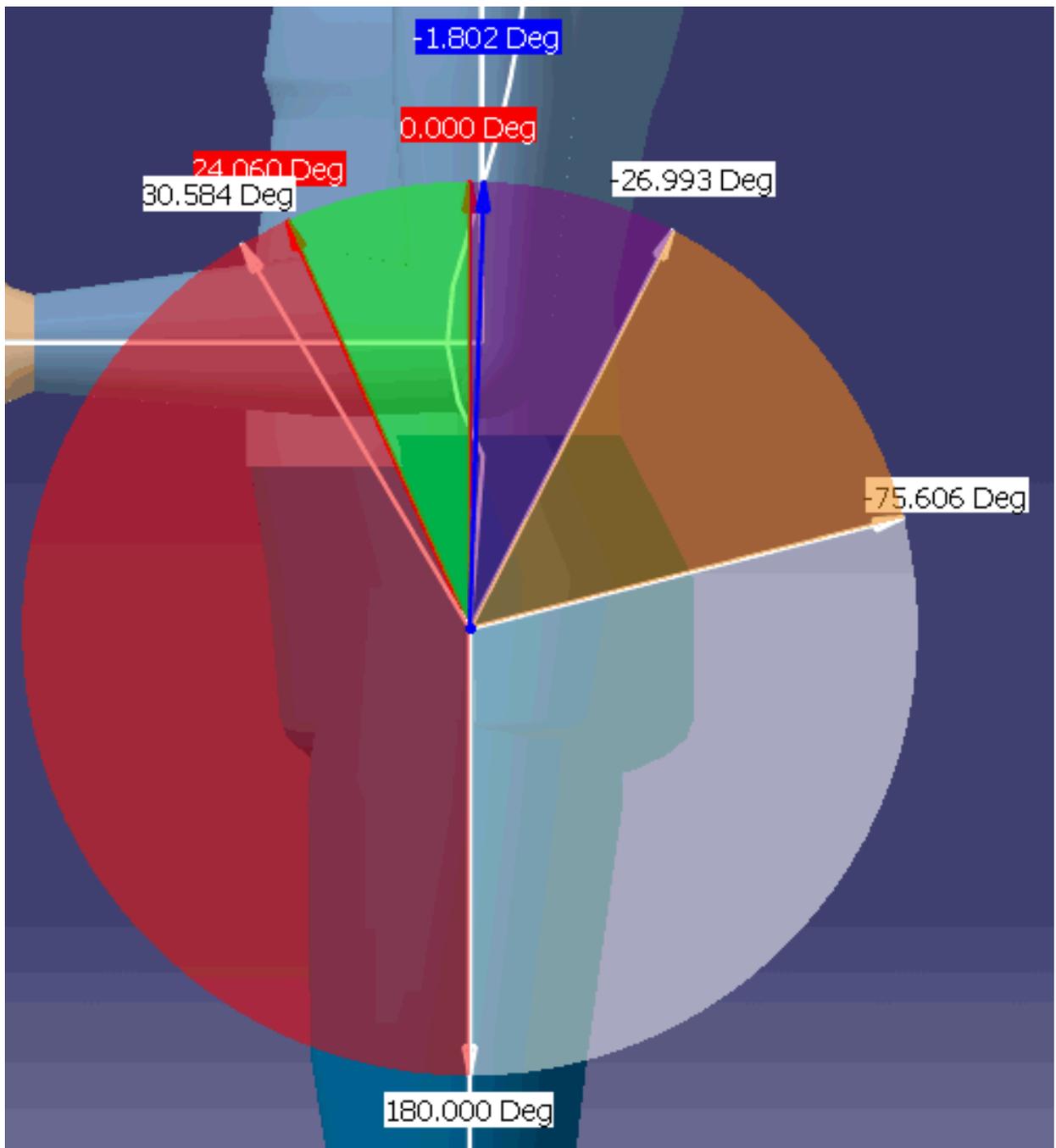
11. **Close** the Customized segments window, and follow the same procedure for a second customized segment.
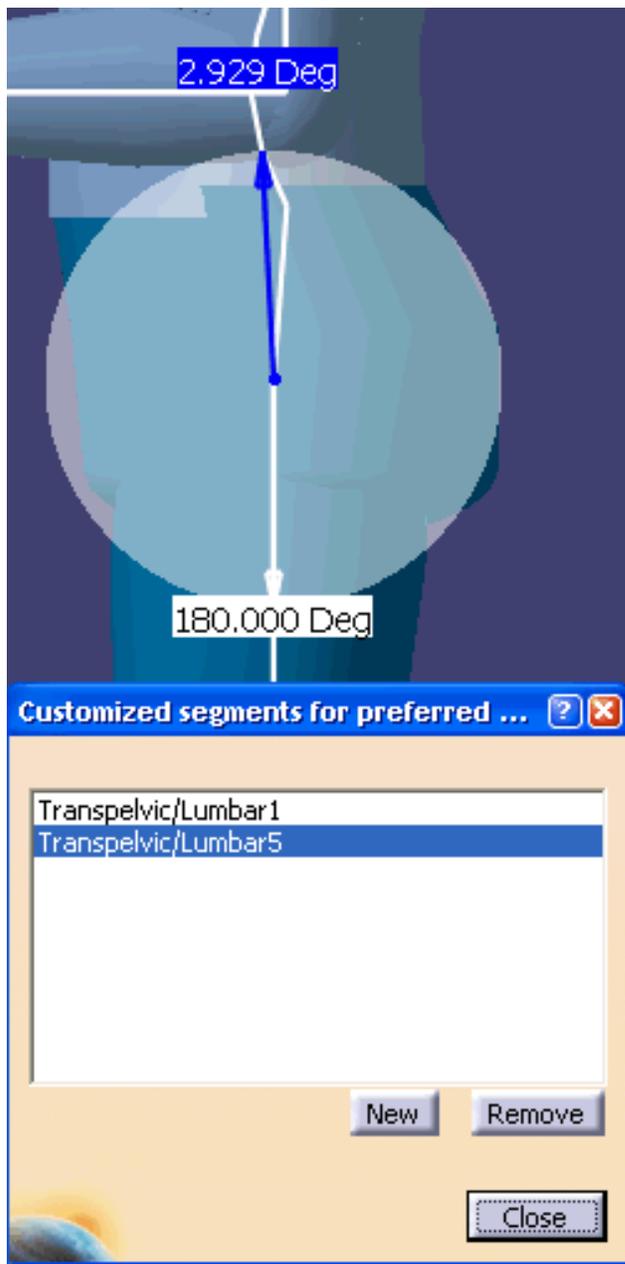
12. **Close** the **Customized Segments for preferred angles** dialog box when completed.

13. To remove a customized segment, select the item in the list. The Remove button will simply remove the Segment item that has been pre-selected in the list. Remove
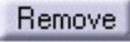
14. To view the customized Segments on the manikin, right-click on the **manikin**, in the contextual window, select **Properties**, **Coloring** tab. Select the options as shown.
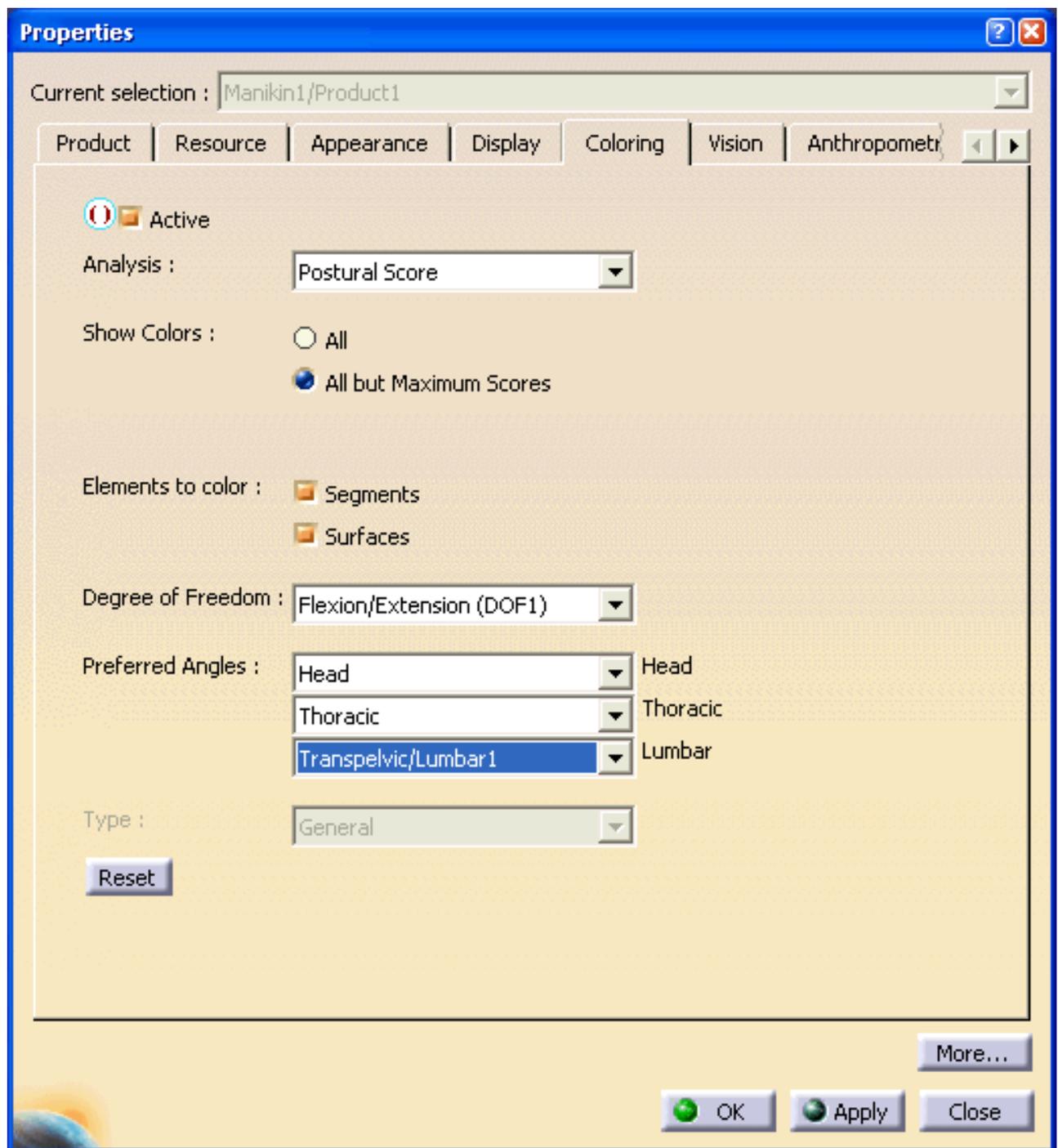
15. Select the **Apply**, and **OK.** The manikin's segment color changes to the selected preferred angle.

16. Select the **Edits the angular limitations and the Preferred angles** , and select the **manikin's** chest. Right-click on the **preferred angles** area, and select the proper DOF if required.

17. A selection or creation of a Customized Preferred Angle will activate the display of the arrows representing the current position (blue arrow) and the cumulative range of motion (white arrows) in the 3D viewer.
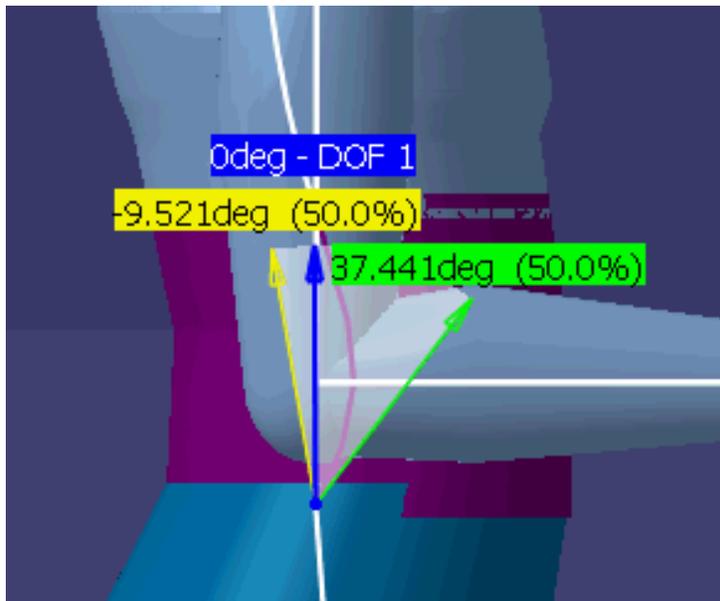
18. The 0 degree position of any customized preferred angle is defined when the body is standing straight (anatomical posture). The Preferred Angles edition and creation capability will be available on this Segment just like on the standard Segments (segments).

19. Click the O deg, (hold and move the mouse), will move the manikin. The color will change according to the **preferred angles** that was previously set.
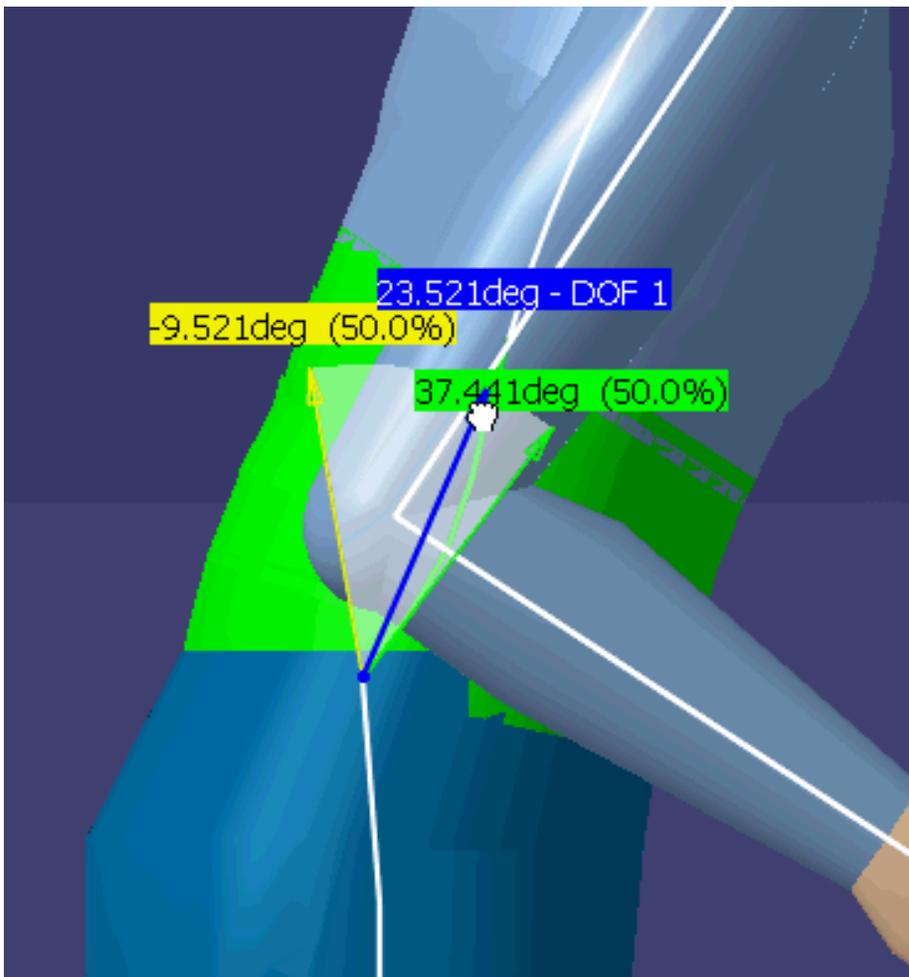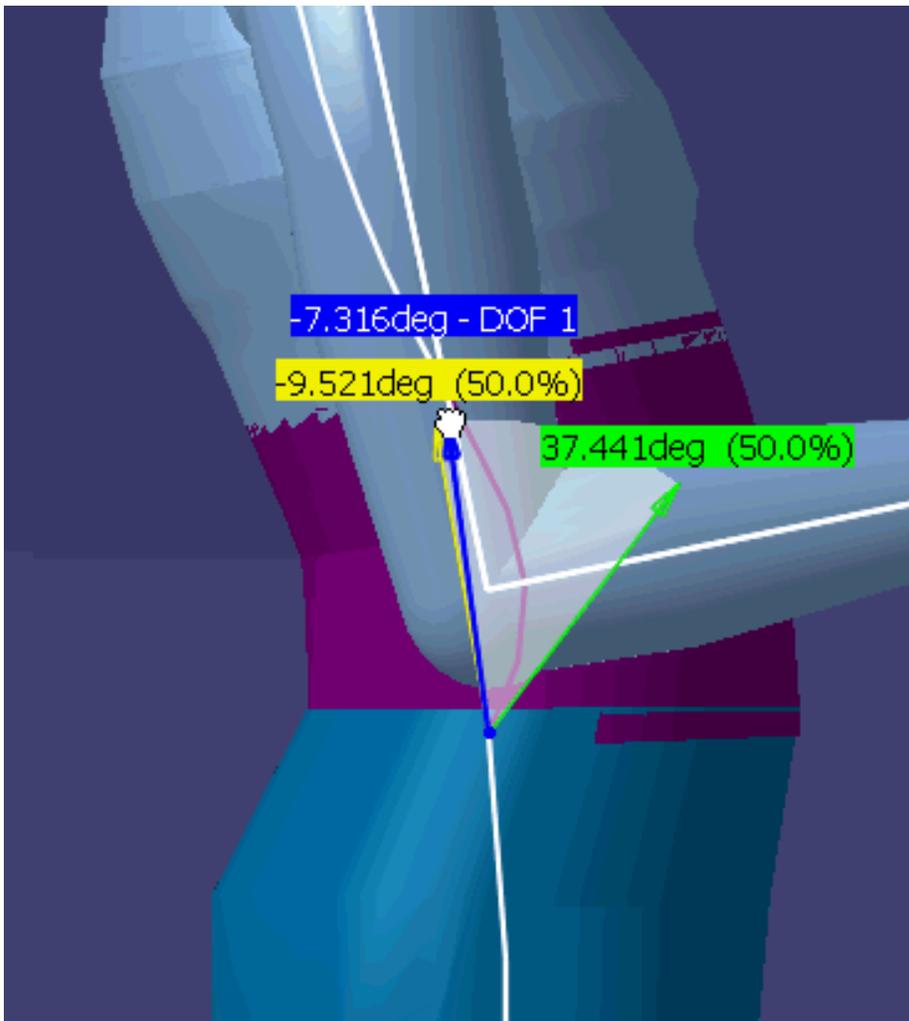
20. The result of the **Customized Preferred Angles** will be displayed in the **Opens the Postural Score Panel** ![icon] just underneath the **Standard Segments** in both the **list** and **chart** presentations. To view this DOF, in the DOF pull-down window, select the DOF2 (abduction/adduction). If you move the manikin the **Postural score** shall be reflected in the dialog box.

Postural Score Analysis (Manikin1)

DOF

DOF2 (abduction/adduction) ▼

Display
● List   ○ Chart

Hand filter
● Whole Hand   ○ Separate Fingers

Segment	Side	Angle (N)	Result (%)	Score
All DOFs Result			32.8	
Current DOF Result				
Selected Result				
Favorites				
Others				
Customized Joint Result				
Thoracic6/Head			42.5	0.0

Close

Postural Score Analysis (Manikin1)

DOF

DOF2 (abduction/adduction) ▼

Display
○ List   ● Chart

Hand filter
● Whole Hand   ○ Separate Fingers

0 10 20 30 40 50 60 70 80 90 100%

All DOFs Result

Current DOF Result

Selected Result

Favorites

Others

Customized Joint Result

   Thoracic6/Head

Close

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21. The results will be updated and can be exported in a **report** with the **Preferred Angles of the standard Segments.**

22. Finally, the **Customized Preferred Angles** will be listed in the **Preferred Angles Properties**, tab as well.

Properties

Current selection : Manikin1/Product1

| Referential | IK Behaviors | Angular Limitations | Prefered Angles |

Segments on which prefered angles have been added :

Segments	DOFs	Manikin
Left Arm	flexion/extension	Manikin1
Left ForeArm	flexion/extension	Manikin1
Lumbar5/Thoracic11	Flexion/Extension (DOF1)	Manikin1
Thoracic6/Head	Abduction/Adduction (DOF2)	Manikin1
Transpelvic/Lumbar1	Flexion/Extension (DOF1)	Manikin1

Remove

More...

OK   Apply   Close