

# **Quintic Software**

## **Tutorial 8a**

Digitisation Analysis

# **V35**

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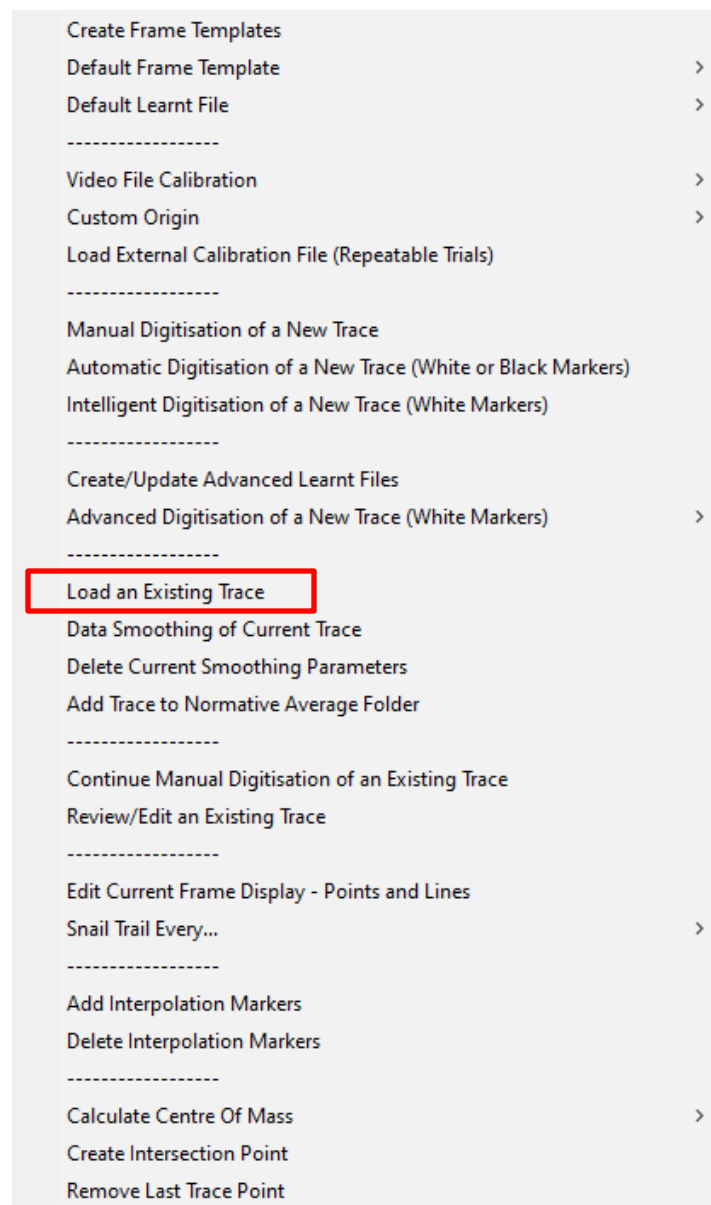


## 1. Viewing the Digitisation Trace

Once you have digitised the video clip, you can use the digitised data output provided for sporting, medical, educational or scientific analysis and presentations.

When the digitisation process has finished, the digitisation trace should automatically load on top of the video file.

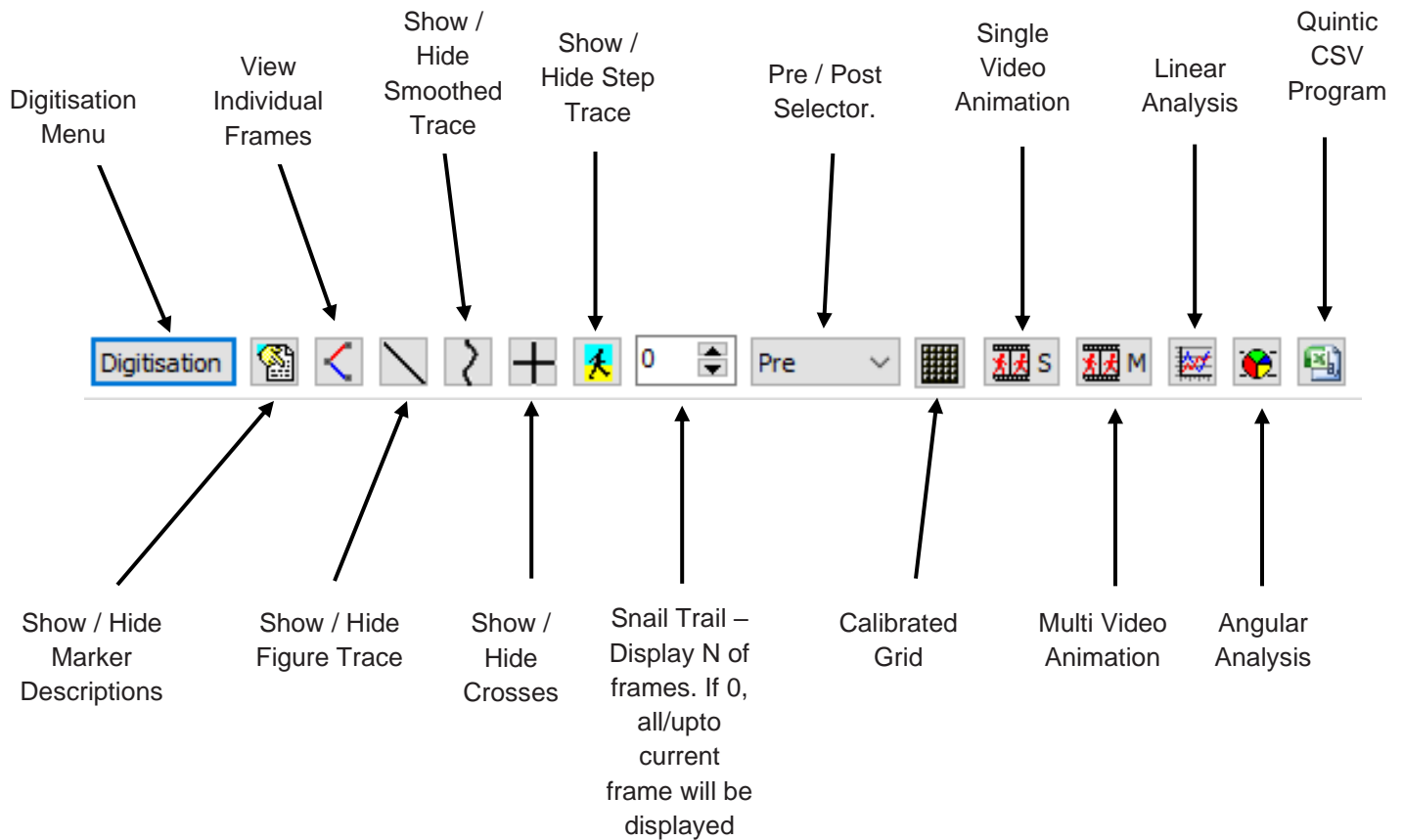
Alternatively, you are able to click on the 'Digitisation' tab and select '**Load an existing trace**' from the 'Digitisation' menu on the left.



## a. Functions

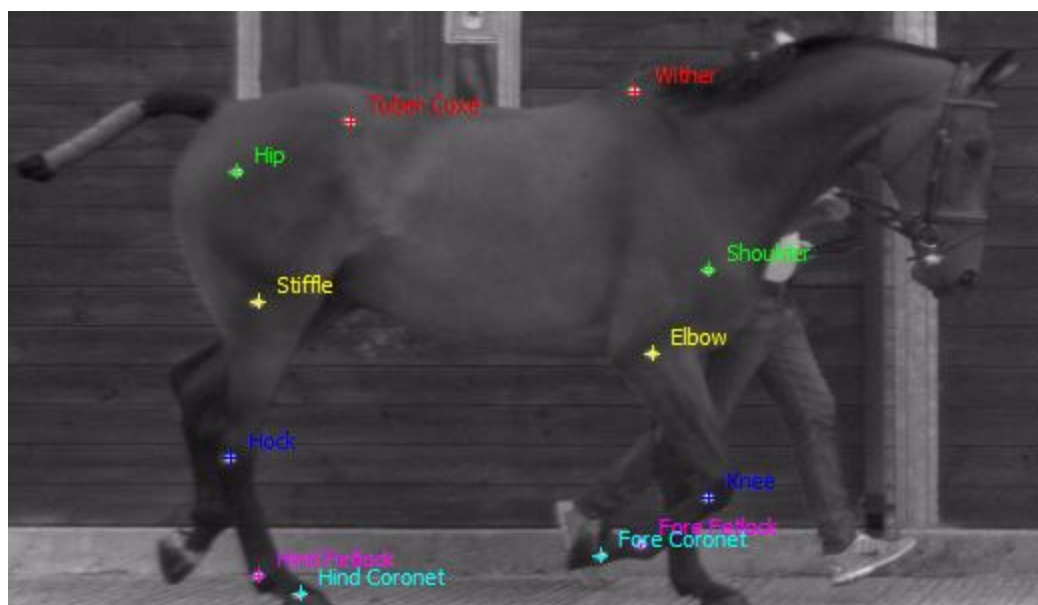
There are a number of different functions available to vary the way the digitisation trace is displayed.

These are available within the '**Digitisation Tab**'



**Digitisation Menu** – This will display the digitisation menu. Within this, the user is able to create frame templates, calibrate and digitise videos and select various other digitisation options. Please see the heading '**Digitisation Menu**' for more information.

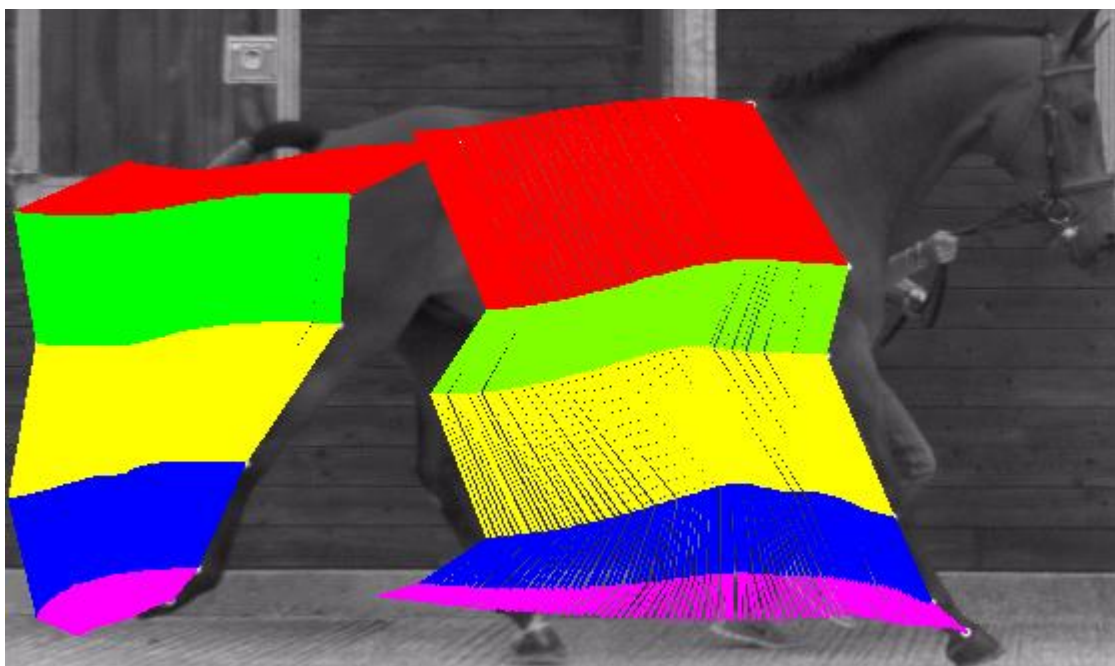
**Show / Hide Marker Descriptions** – This will display the marker names for the digitised trace. For this to be active, the crosses must also be selected.



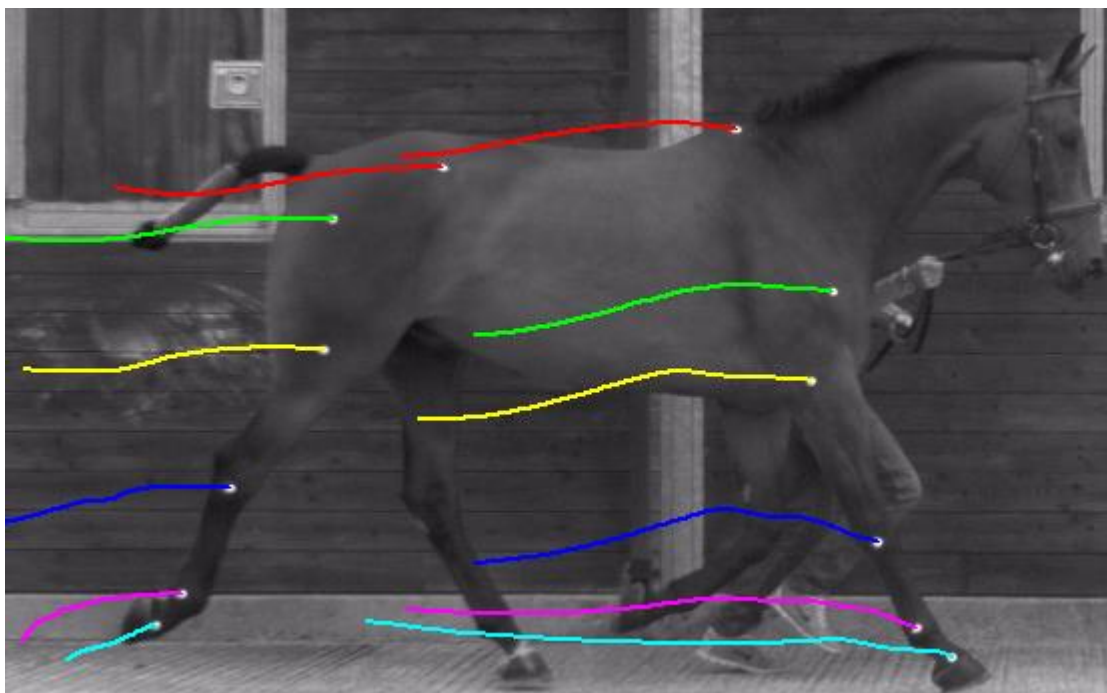
**View Individual Frames** – This will display the digitisation trace for every individual frame. Any connections between digitisation points will also be displayed.



**Show / Hide Figure Trace** – This will display the digitisation trace and any connections between the points between the current digitised frame and the first digitised frame (Step Trace also selected).

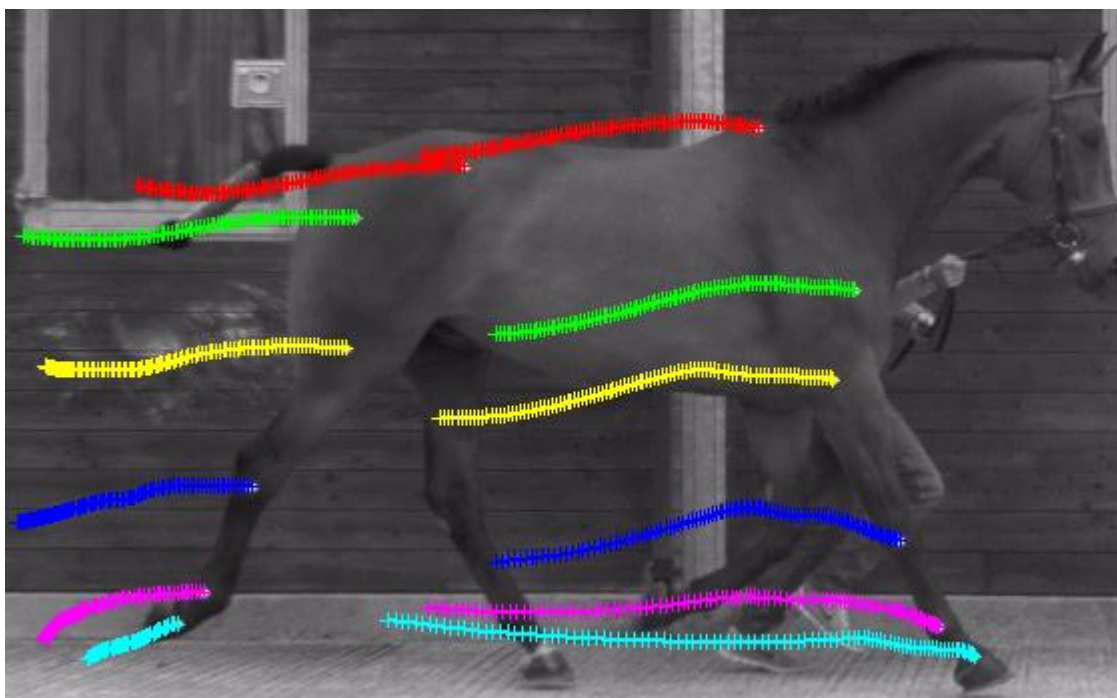


**Show / Hide Smoothed Trace** – This will display the digitisation trace for the points that have been digitised, between the current digitised frame and the first digitised frame (Step trace also selected). Draws the “trajectory” of each digitised point.





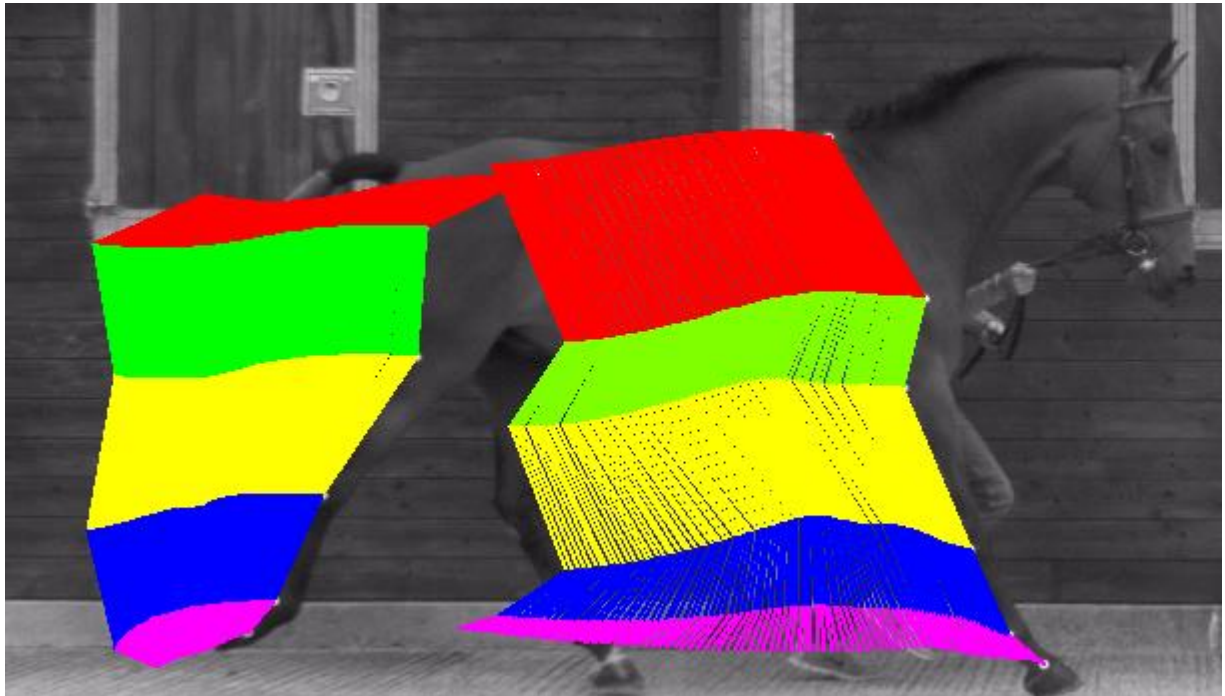
**Show / Hide Crosses** – This will display the digitisation trace as crosses for the points that have been digitised, between the current digitised frame and the first digitised frame (only if step trace is on).



**Show / Hide Step Trace** – When this button is not selected, the entire trace will be displayed when you play the clip. When this button is selected, the trace will develop as the clip is played. This is for the Figure Trace, Smoothed trace and Crosses only.



When the Step Trace Button is not selected (figure trace also displayed)



When the Step Trace Button is selected (figure trace also displayed)

**Snail Trail** – Snail Trail: Allows the user to see 'x' number of frames. This is for the Figure Trace, Smoothed trace and Crosses only. Users can select whether they would like the Snail Trail to be Pre (pre the current frame), Post (post the current frame) or Pre & Post. The example below shows a snail trail of 5 Pre with the figure trace also displayed.





**Pre / Post Selector** – This button allows the user to control whether the Snail Trail is ‘Pre’ which will display the digitisation trace before the current frame, ‘Post’ which will display the digitisation trace after the current frame, or ‘Pre/Post’ which will display the digitisation trace with a combination of Pre and Post frames.

**Calibrated Grid** – This button allows the user to display a calibrated grid onto the video. Please note that the video does have to be calibrated in the first instance. Please see the heading ‘**Calibrated Grid**’ for further information.

**Single Video Animation** – This button opens the animation window. It is a black screen that shows only the digitisation traces when the video is played through. Please see the heading ‘**Single Video Animation**’ for further information.

**Multi Video Animation** – This button opens the multi-animation window. This allows the users to overlay digitisation traces from different videos that are open within Quintic. This feature is only available within Quintic Biomechanics v33. Please see the heading ‘**Multi Animation**’ for further information.

**Linear Analysis** – This button opens the single or multi linear analysis. The user is able to measure distance, velocity and acceleration for the digitised points throughout the video. (1 Point in Quintic Sports v33, 2 points in Quintic Coaching v33 and up to 21 points in Quintic Biomechanics v33). Please see Tutorial 8B/8C for further information.

**Angular Analysis** – This button opens the single or multi-angular analysis. The user is able to measure angular displacement, velocity and acceleration. Available in Coaching v33 (2 points to the vertical/horizontal) and Biomechanics v33. Please see Tutorial 8B/8C for further information.

**Quintic CSV Program** – This allows the video within Quintic Biomechanics v33 software to be synchronised with the data output from other biomechanical equipment, providing this equipment is able to produce a .csv data output file. Please see Tutorial 9 ‘CSV’ for further information.

## b. Calibrated Grid

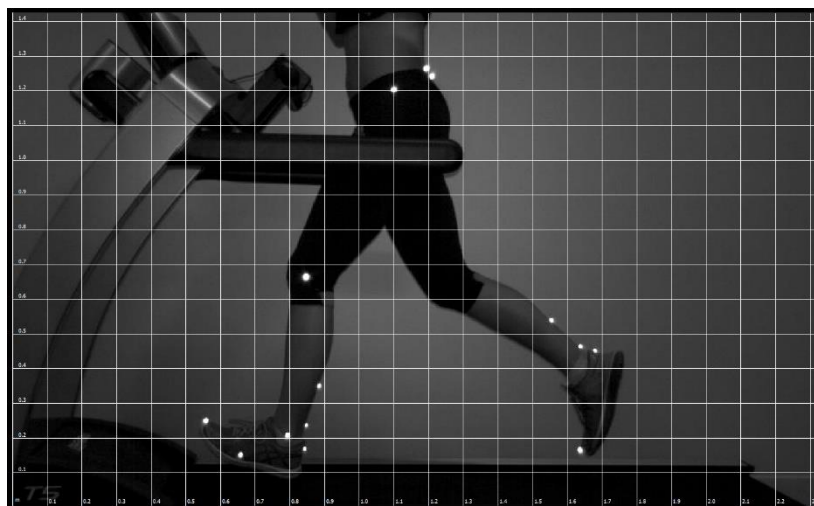
The Calibrated Grid button  allows the user to display a calibrated grid on the video.

When pressed, the user is able to select whether they would like to display the 'Axes Only' or 'Full Grid'. As default the Calibrated Grid is Off.

Please see below example of the Calibrated Grid with 'Axes Only' switched on.




Please see below example of the Calibrated Grid with 'Full Grid' switched on.



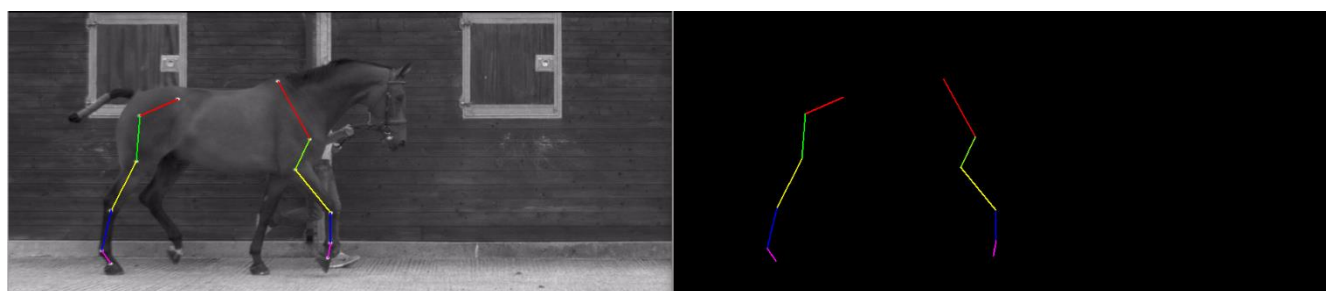
Users are also able to adjust the increments of the grid by going to Increments > then choosing one of the 5 increment options available. These increment options are dynamic based on the calibration of the video.

The origin point of the calibrated grid will be 0,0 in the bottom left hand corner, unless a Custom Origin is used, which will then use the Custom Origin point as 0,0.

### c. Single Video Animation

When the Single Animation Button  is pressed, this will open the animation window. It is a black screen that shows only the digitisation trace when the video is played through.

The Animation window will display the same digitisation trace that is within the main window, whether that be individual frames, smoothed trace, crosses, step trace or the snail trail.




Experiment with these buttons. See what images you can create.

### d. Multi Animation

The Multi Animation Window will allow the user to overlay digitisation traces from the different windows within Quintic Biomechanics v33 software in the same animation window.

Up to 6 different digitisation traces can be overlaid within the Multi Animation window.

First, ensure that all the videos are synchronised (using the time event markers) to a common time point within the video.

Then, simply press the Multi Animation button  within the Main window. Once pressed, this will display the digitisation trace with the Animation window. Then simply go to the other windows within Quintic Biomechanics v33 software (i.e Two, Three, Four, Five or Six) and press the Multi Animation button within these windows to add the associated digitisation trace.

Within the Multi Animation window, users also have the ability to change the colour of the digitisation trace, so they know which digitisation trace relates to which video. Users are able to do this by pressing the Colours per Window option.



Users have the ability to change the colours within the 'Colours Per Window' option of the Multi-Animation Window.

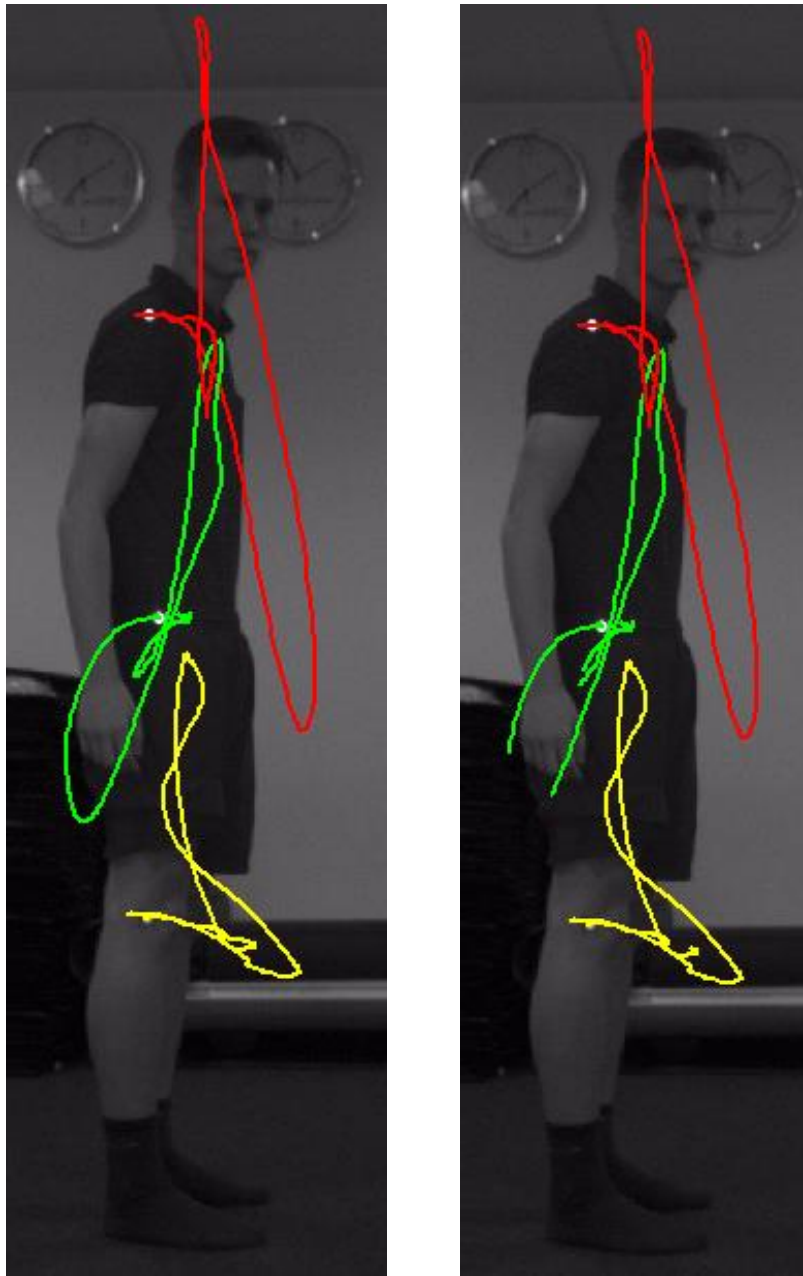
Once the user has created their Multi Animation Window and selected the Colours Per Window' option, the user is able to control the colours for each window, by clicking either 1, 2, 3, 4, 5 or 6. This will then bring up the colour option window. Click your preferred colour for each animation trace then click OK to set it.





#### ***e. Show / Un-show Interpolated Regions***

The user also has the option to show / un-show interpolated regions of a digitised trace on the video, providing the whole digitisation template is not lost.



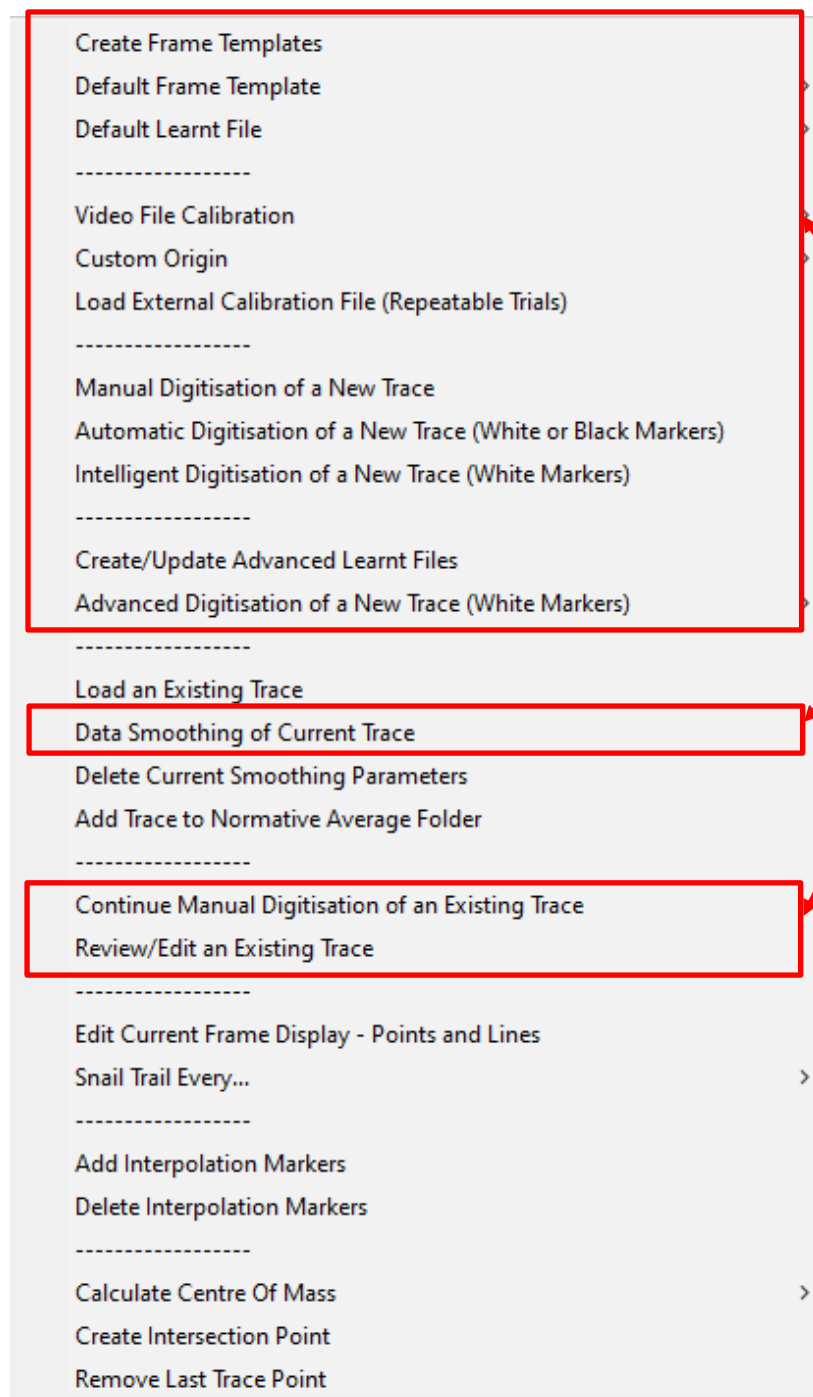
To show or un-show the interpolated regions, go to the 'Help' tab then the settings option within the help menu. Then either tick or untick the 'Show Interpolated Regions' option to show or un-show the interpolated region of the trace (providing the whole digitisation template has not been lost).



**Show Interpolated Regions**

## 2. Digitisation Menu

There are a range of digitisation options available within the Digitisation Menu. Please see below for further information on these.



These have already been covered in Tutorials 7a, 7b, 7c and 7d.

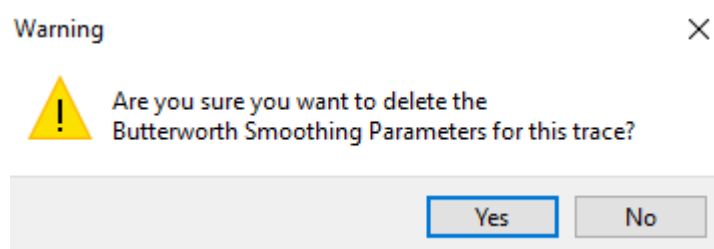
As some of the features have already been covered in previous tutorials, please see below more information on features which have not been already covered.

## a. Options

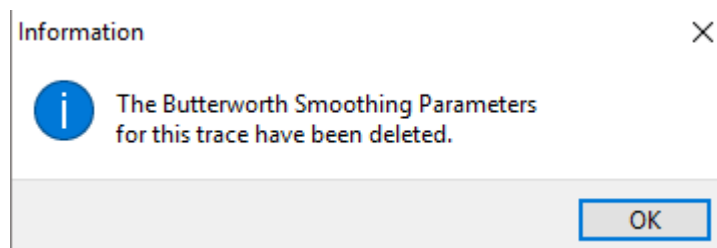
**Load an Existing Trace** – This button will load any digitisation trace that is associated with the video if there is one present.

**Delete Current Smoothing Parameters** – This will delete any smoothing parameters that have been generated for the digitisation trace.

Once this button has been pressed the following pop-up window will appear asking to confirm whether you want to remove the smoothing parameters for this trace.



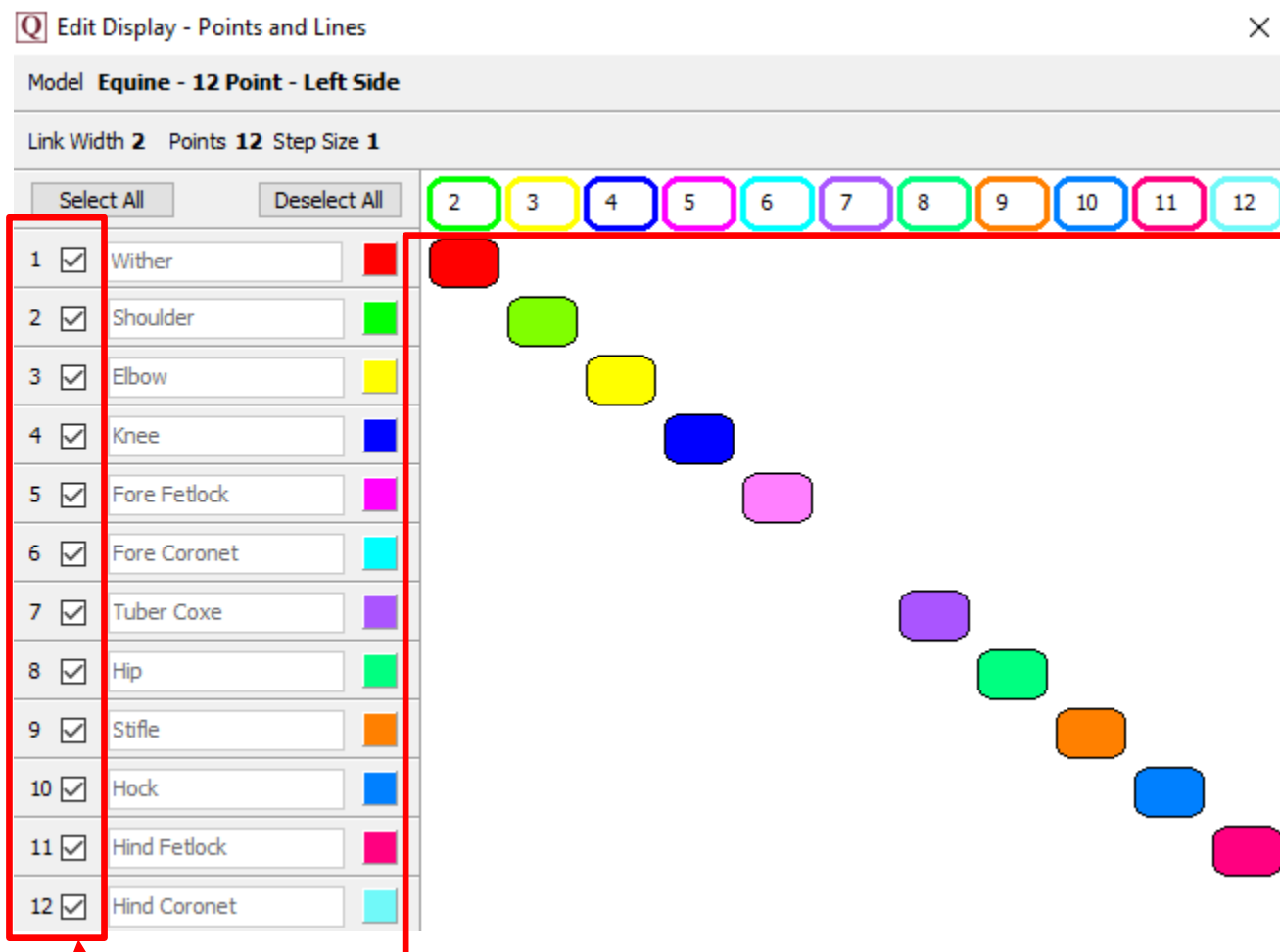
If you have pressed yes, the following pop up window will appear to confirm that the smoothing parameters have been deleted.



**Add Trace to Normative Average Folder** – This will add the digitisation trace and all relevant files into its own Normative Average folder. For more information on the Normative Average, please see Tutorial 8C.


**Edit Current Frame Display (Points and Lines)** – This allows the user to edit which points and lines are displayed for the digitisation trace.

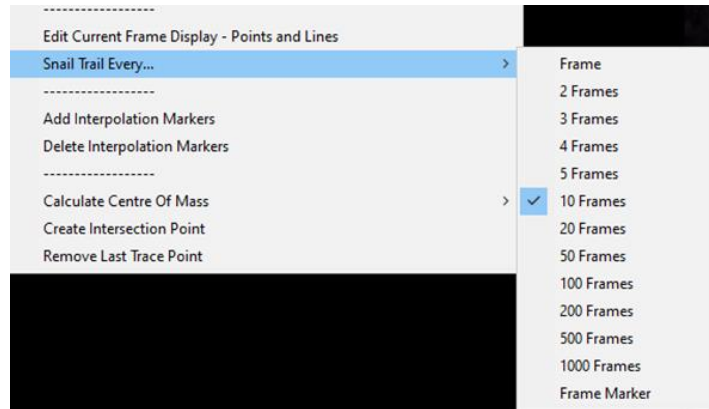
Once this button has been pressed, this will bring up the points and lines window. The user is then able to control which points and lines they would like to appear on the digitisation trace.



Ticking or Unticking the relevant points will either show or hide that point from the digitisation trace.

Selecting or Deselecting the links between the points, will either show or hide the lines between the digitisation points. (A broken rectangle shows "not lines").

**Snail Trail Every...** - Users can select to display the digitisation trace at every Nth frame. We would recommend using this with the figure trace option selected .



Please see below example, highlighting the figure trace on every 10 frames.

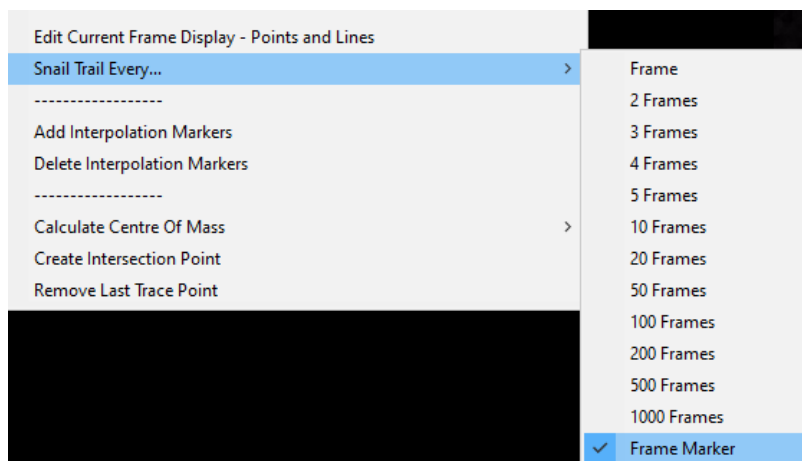




## Frame Event Markers

Users can select to display the digitisation trace at every frame event marker by going into the Digitisation Tab > Digitisation > Snail Trail Every > then choosing Frame Marker.


Please note that you must have frame markers set for the video.



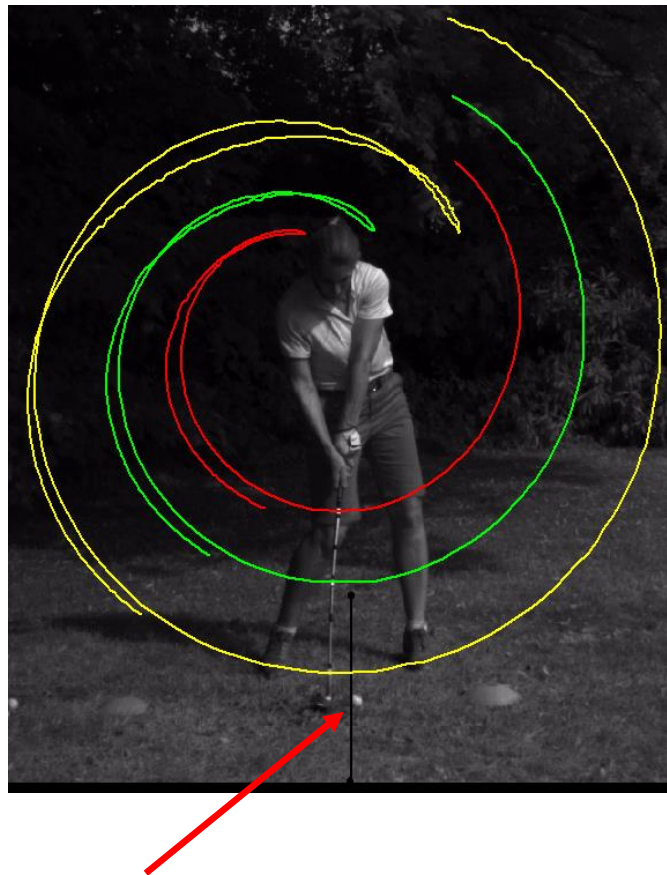
Please see below example, highlighting the figure trace on every frame marker.



**Add Interpolation Markers** – Once a digitisation trace has been created, Interpolation Markers can be added so that when graphs are produced, the timing of particular events is marked on the graph (e.g. ball impact, maximum knee flexion).

To add an Interpolation Marker, please ensure the digitisation trace is visible on screen by pressing the  button.

Select 'Add Interpolation Markers' within the Digitisation menu. Once selected, simply scroll to the frame of interest to you, whether this be ball impact, maximum knee flexion etc and draw a line to bisect the digitisation trace.



Shows the Interpolation marker being drawn at the edge of the golf ball to indicate where the exact point of impact is during the video/digitisation trace.

Once you have added your interpolation marker(s) to the video, the Quintic software will automatically save these.

**Delete Interpolation Markers** – This will delete all Interpolation Markers that are associated with the video.

**Calculate Centre of Mass** – This will allow the user to calculate the Centre of Mass of either a male or female athlete. Please see below “Centre of Mass Analysis” for further information.

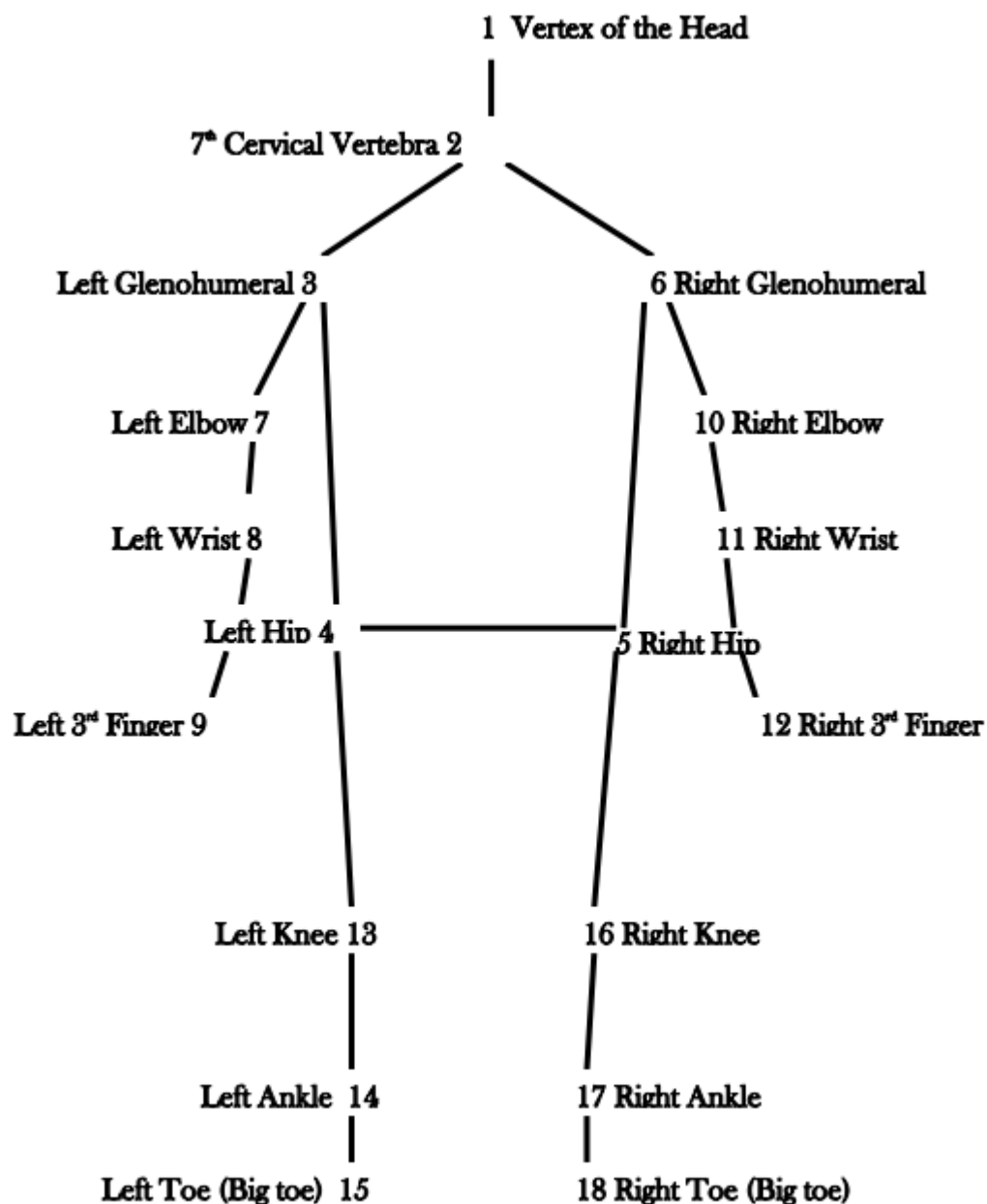
**Create Intersection Point** – This will allow the user to create an intersection point between any two pairs of points throughout the digitisation trace. Please see below “Create an Intersection Point” for further information.

**Remove Last Trace Point** – This will remove the last digitisation point, whether this be the Centre of Mass point or Intersection.

## b. Centre of Mass Analysis

We have 3 different Centre of Mass Models available; these are: 18COM (Single Step), 18COM – 2 Step or the 18COM – 5 Step and can be found within the 'Templates' folder with the Quintic Sample Videos folder.

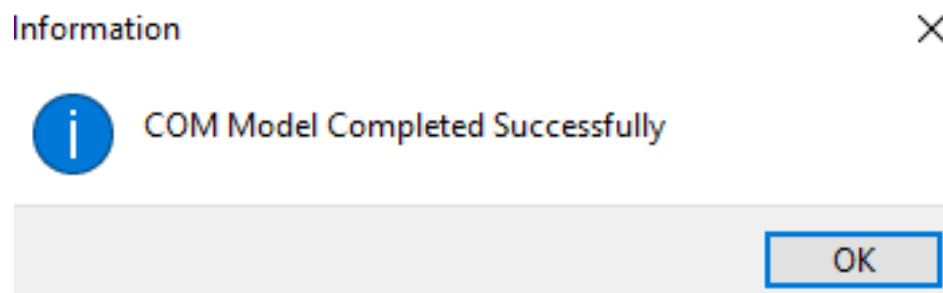
Centre of Mass templates will require Manual Digitisation - please refer to Tutorial 7a Manual Digitisation for more information on this process. The points to be identified within the Centre of Mass model are as follows:



Once you have finished digitising and want to create the 19<sup>th</sup> point (Centre of Mass), simply click the Calculate the Centre of Mass option within the Digitisation menu, selecting whether your athlete is either Male or Female.

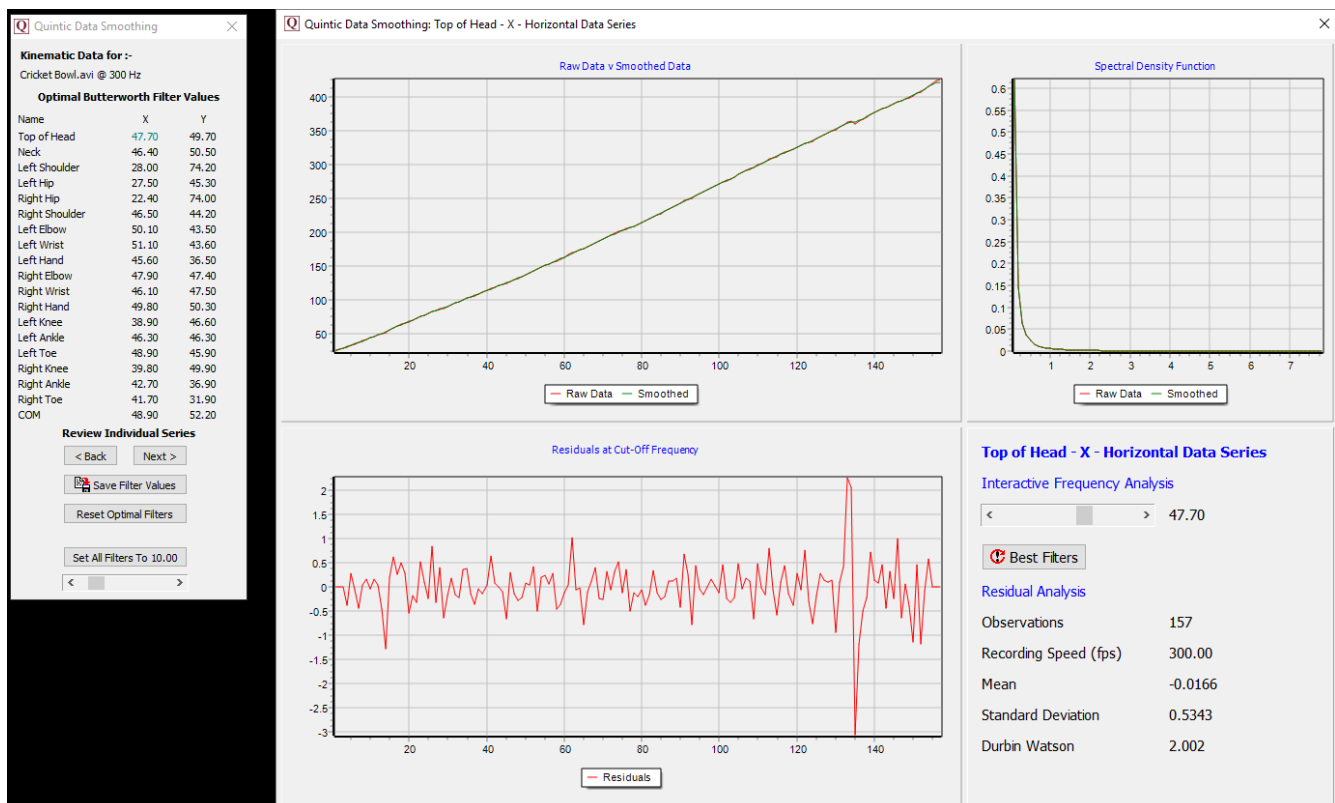
Once you have clicked either the Male or Female option, the Centre of Mass point will now be generated throughout the digitisation trace.

The following pop up message will appear:



Unlike older versions of Quintic Biomechanics (v29/v26 etc) there is no need for the video file to be duplicated.

Once you have clicked OK, if the video has smoothing parameters applied to it, the smoothing window will appear so that you are able to smooth the Centre of Mass point.

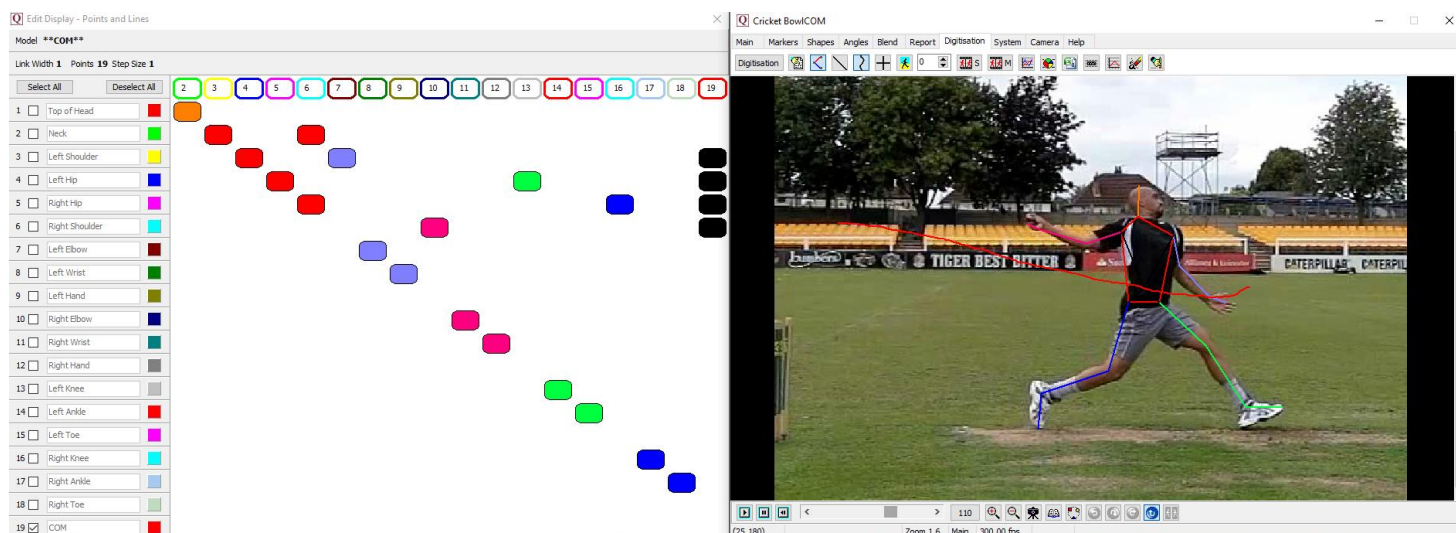




Once you are happy with the smoothing parameters applied, simply click Save Filter Values.

If the digitisation trace has no smoothing parameters applied, the smoothing window will not appear after the Centre of Mass point has been generated.

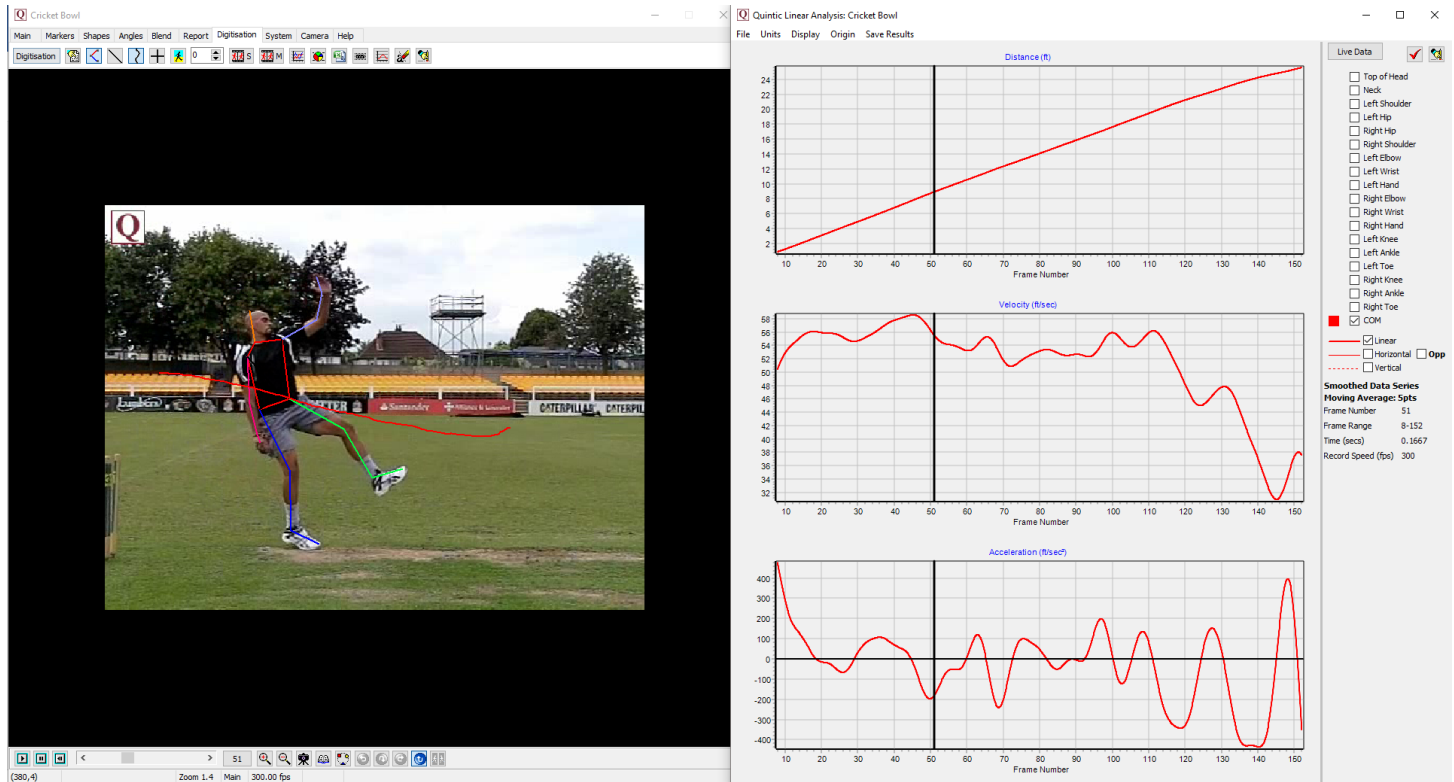
You are also able to edit whether the Centre of Mass point is displayed, in the same way as any other point, through the 'Edit Current Frame Display (Points and Lines)' button.



'The 'Centre of Mass' (COM) model has been implemented, with the assistance of Philip Graham-Smith, into the Quintic Biomechanics video analysis software following the 18 point manual digitisation process. The 'COM' model calculations have been developed and adapted using the biomechanics published literature below.

*Zatsiorsky, V. and Seluyanov, V. (1983). The mass and inertia characteristics of the main segments of the human body. In Biomechanics VIII-B (Edited by Matsui, H. and Kobayashi, K.), pp. 1152-1 159. Human Kinetic, Illinois.*

*Adjustments To Zatsiorsky-Seluyanov's Segment Inertia Parameters. Paolo de Leva : Kinesiology Department, Indiana University, Bloomington, IN 47405, U.S.A. Journal Biomechanics Vol 29, 9, 1223-1230. 1996'.*



### *\*Practical Example\**



Open the '**Cricket Bowl**' video from the '**COM**' folder. (There is already a completed COM trace and data to be viewed initially before creating your own. You may wish to create a duplicate video in order to compare results.)

### c. Create an Intersection Point

This model can be used to identify the point at which 2 pairs of digitised points intersect.









To create the intersection point, simply click on the 'Create Intersection Point' button.

This will bring up the intersection menu.



 Edit Display - Trajectory 

Model **Gait - Back View**

Link Width **2** Points **7** Step Size **1**









	 Intersection		Pair A	Pair B
1	Cervical Spine		<input type="checkbox"/>	<input type="checkbox"/>
2	Left Shoulder		<input type="checkbox"/>	<input type="checkbox"/>
3	Right Shoulder		<input type="checkbox"/>	<input type="checkbox"/>
4	Lumbar Spine		<input type="checkbox"/>	<input type="checkbox"/>
5	Sacral Spine		<input type="checkbox"/>	<input type="checkbox"/>
6	Left Pelvis		<input type="checkbox"/>	<input type="checkbox"/>
7	Right Pelvis		<input type="checkbox"/>	<input type="checkbox"/>

Simply select the two pairs of points that you would like to create the intersection between.

 Edit Display - Trajectory 

Model **Gait - Back View**

Link Width **2** Points **7** Step Size **1**

	 Intersection		Pair A	Pair B
1	Cervical Spine		<input type="checkbox"/>	<input type="checkbox"/>
2	Left Shoulder		<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Right Shoulder		<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Lumbar Spine		<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Sacral Spine		<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Left Pelvis		<input type="checkbox"/>	<input type="checkbox"/>
7	Right Pelvis		<input type="checkbox"/>	<input type="checkbox"/>

You are able to name the intersection by typing the name you would like in the top box.  
You are also able to change the colour of the intersection point.

Once you have selected the two pairs of points you would like to intersect, simply click the intersect button to create that point.

Once you have clicked OK, if the video has smoothing parameters applied to it, the smoothing window will appear so that you are able to smooth the Intersection point.

Once you are happy with the smoothing parameters applied, simply click Save Filter Values.

If the digitisation trace has no smoothing parameters applied, the smoothing window will not appear after the Intersection point has been generated.

You are also able to edit whether the Intersection point/line(s) are displayed in the same way as any other point, through the 'Edit Current Frame Display (Points and Lines)' button.

