

# TUTORIAL 7

**Quintic<sup>®</sup>**

*# 1 for Sports Analysis*



# Tutorial 7 – Digitisation – Analysis

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**N.B. Further information can be found on Quintic Analysis within Appendix K-Quintic Analysis.**

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

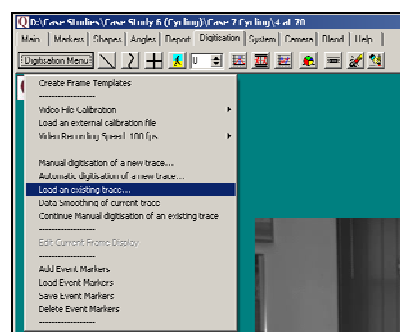
**[GO TO RECAP ON THE QUESTION SHEET](#)**  
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## **1: Viewing options**


Load the video clip ‘Cycling\_100fps’ from the Quintic Sample Video folder.


A digitisation trace has already been completed for this video along with calibration and data smoothing. To use the output data it needs to be re-loaded onto the video.


Click on the ‘Digitisation’ tab and select ‘Load an existing trace...’ from the ‘Digitisation Menu’ on the left.




There are a number of functions available to vary the way in which the trace is displayed on the video clip:

 = Shows the traces from individual frames. (This function is not available in Quintic Coaching).

 = Joins the traces of each point between frames. (i.e. it will show the path of the knee throughout the clip)

 = Shows the crosses created during the digitisation for every frame.

**Experiment with these buttons.**

 = **Show/ Hide 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



(NB: one of these functions must be selected for the trace to appear on the video)



 = **View Individual Frames:** The trace is displayed frame-by-frame.



= **Snail Trail:** Allows the user to see the last X number of frames (5 will show the current frame plus the trace for the previous 5 frames).

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**2: Other Functions**



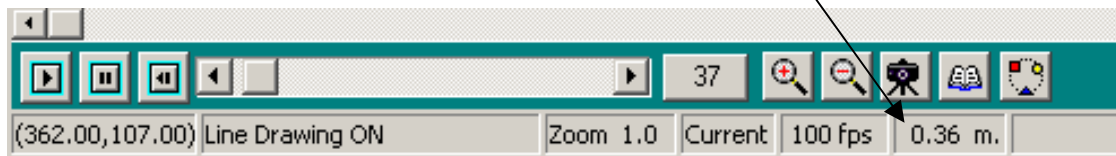
= **Line Drawing/Ruler:** This acts as a ruler. It can be used to measure distances on the image once the video has been calibrated. Select this function and draw a line along the athlete's left forearm. The measurement is displayed at the bottom of the window below the 'Memo-pad' and 'Single Image Capture' buttons. The measurement here states that the forearm is 0.36m long.



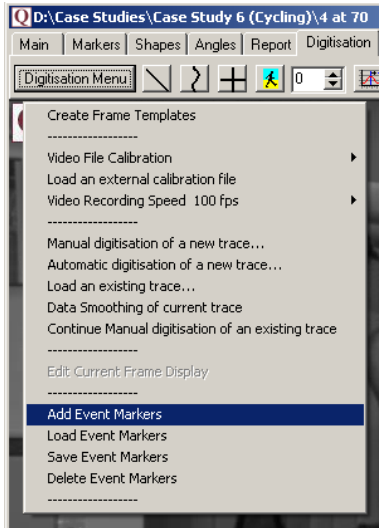
(Frame 37)



= These buttons can again be used to erase the line drawn.



**Event Markers:** Once a digitisation trace has been created Event Markers can be added so that when graphs are produced, the timing of particular events is marked (E.g. ball impact, maximum knee flexion).



Ensure that the trace is visible on the screen by pressing this button:



Under the **'Digitisation Menu'**, select **'Add Event Markers'**. Scroll to the frame when the cyclist's toe reaches the bottom of the cycling movement and draw a line bisecting the toes path.

You can then **'Save'** or **'Clear'** these markers and **'Load'** them again when you restart the system as you did with the shapes function. These are selected from the **'Digitisation Menu'** as above.

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**3: Animation Window**



= This button opens the **Animation Window**. It is a black screen that shows only the digitisation traces when the video is played through.

Click this button so that the traces are visible on screen:



Open the **Animation Window** by pressing: . The traces are visible against the black screen. Now press **Play** in the main window.

By right clicking in the Animation Window the background colour can be changed.

These buttons change the way the trace is viewed in the Animation Window in the same way they do in the Main Window.



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

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**4: Analysis**

Using the video ‘Cycling\_100fps’ from the trampoline folder.

Quintic allows the user to analyse the digitised movement. These values are automatically calculated for you and can be viewed by pressing either the linear analysis or the angular **Analysis** button. (N.B the video has to be calibrated)



= Linear analysis, (Distance, Velocity and Acceleration)

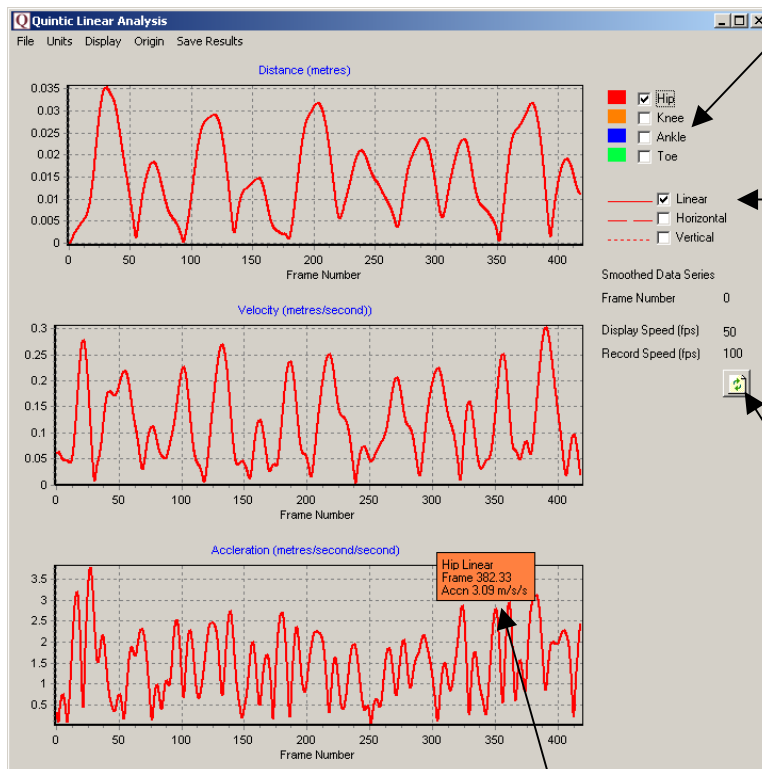


= Angular Analysis, (Angular Displacement, Angular Velocity and Angular Acceleration)

**Linear Analysis**

Click on the  button to open the linear analysis window

Select which markers you want to display on the graph by ticking the relevant boxes.

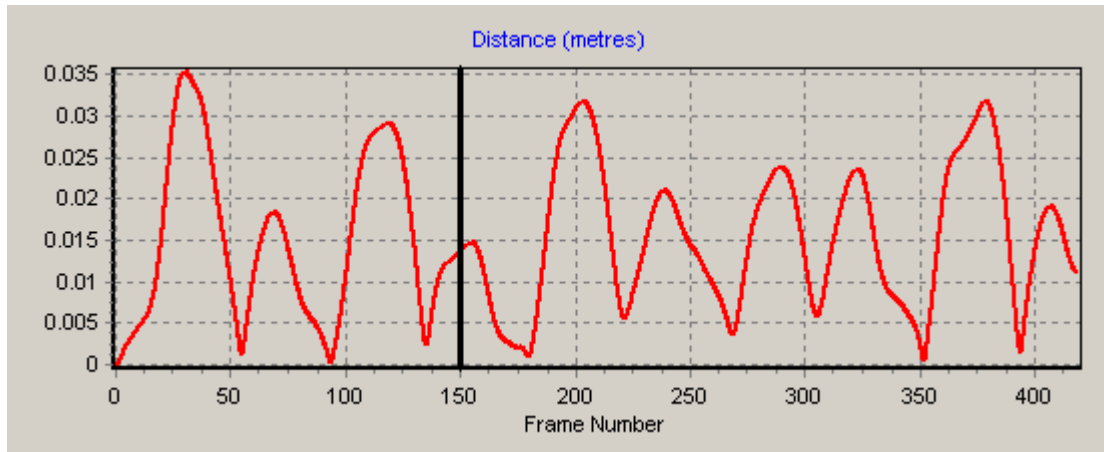


Select linear, horizontal or vertical values by ticking the relevant box. These values will then also be displayed on the corresponding graphs.

Click on the refresh button to refresh the graphs.

Scroll the cursor over the graph to see the data for each frame.

Both the video and analysis windows are synchronised, therefore if the video is played while the separate analysis window is open a black line indicates the current video frame.



### **Other functions from the top menu:**

**File:** This function allows you to print, save or copy any of the graphs into any other document (i.e. word, excel, PowerPoint)

**Units:** This function allows the you to change the units between metres, feet, kph (kilometres per hour) and mph (miles per hour).

**Display:** This function allows the user to turn the series values off and on, as well as the frame indicator and any event markers that appear on the screen.

**Origin:** This function changes the origin of the data from either the start point of the marker (relative) or the 0,0 coordinate (absolute).

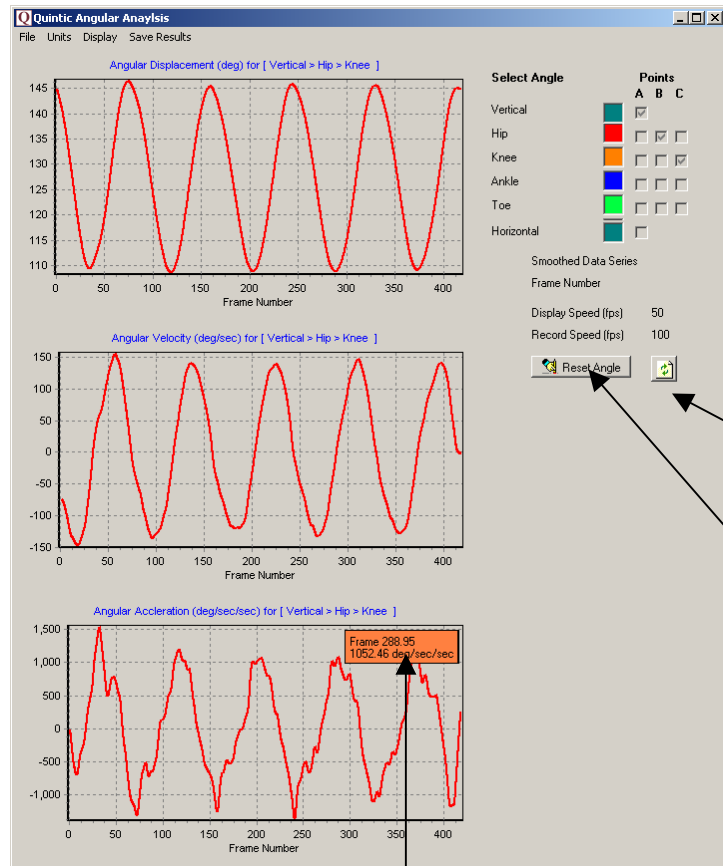
**Save Results:** You can choose to save the results as an Excel file (.xls) or as a Data file (.dat). The results will be automatically saved within the same folder as the video and with the same name as the video as well.


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## Angular Analysis

Click on the  button to open the linear analysis window



To select an angle for analysis first click on the  button. This refreshes the angle selection grids and allows you to select a particular angle.

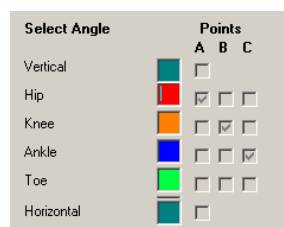
Click on the refresh button to refresh the graphs.

Angle Reset Button

Scroll the cursor over the graph to see the data for each frame.

E.g. To select the knee angle tick the following boxes:

Column A tick the Hip box  
 Column B tick the Knee box  
 Column C tick the Ankle box



**Other functions from the top menu:**

**File:** This function allows you to print, save or copy any of the graphs into any other document (i.e. word, excel, PowerPoint)

**Units:** this function allows the user to change the units between degrees and radians.

**Display:** This function allows the user to turn off and on the series values, as well as the frame indicator and any event markers that appear on the screen. The reflex angle function also allows the user to flip the measured angle.

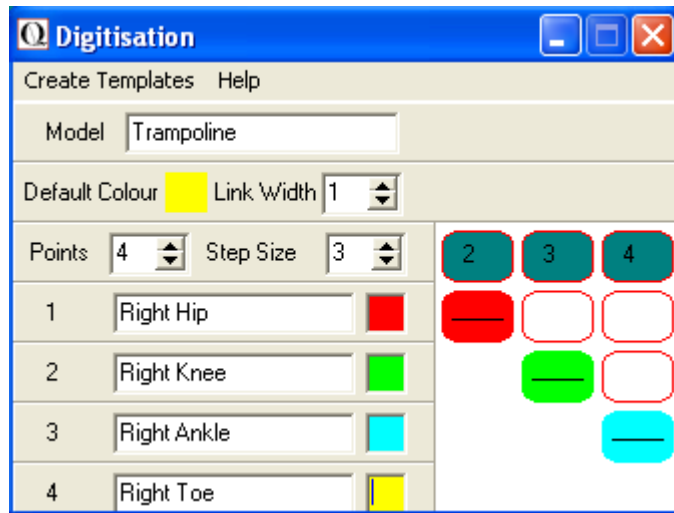
**Save Results:** You can choose to save the results as an Excel file (.xls) or as a Data file (.dat). The results will be automatically saved within the same folder as the video. When saving angular results a file name needs to be given, as only the results for the current angle will be saved.

## Tutorial 7 – Question Sheet

### RECAP

Open the ‘No Twist Side View’ from the trampoline folder.

- 1) Create this digitisation template. (If you are using Quintic Coaching create a 1 point template and trace a point of your choice).



- 2) Calibrate the video by drawing a line in the horizontal direction across the bed of the trampoline. It is 4.28 in length.

- 3) Digitise the video between frames 117 and 168.

- 4) Save the digitisation trace.

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Open the video ‘No Twist Side View’ from the trampoline folder.

- 1) (i) Set markers at frames 8, 46, 62, 88, 145, 209. What key points during the movement do these frames represent?

Frame 8:.....

Frame 46:.....

Frame 62:.....

Frame 88:.....



Frame 145:.....



Frame 209:.....



(3)



(ii) Load the digitisation trace you created in the ‘RECAP’ section.




(iii) Create a 6 frame ‘multiple screen capture’ displaying some parts of the digitisation trace on the 6 marked frames in accordance with the following instructions. Do this by pressing down the following buttons:

Frame 12 =  + 

Frame 15 =  + 

Frame 17 =  + 

Frame 19 =  + 

Frame 22 =  +  + 

Frame 34 =  +  +  + 

(iv) Save this sequence as a JPEG and ask your teacher if you can print.

(6)

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- 2) Body segments are always measured between joints ( i.e. The lower leg is measured between the knee and the ankle bone; not the floor).

Use the ruler function to measure the following lengths of body segments:

Body segment	Length
Forearm	
Foot	
Lower leg	
Upper arm	
Hand	
Thigh	
Trunk (shoulder to hip)	

(7)

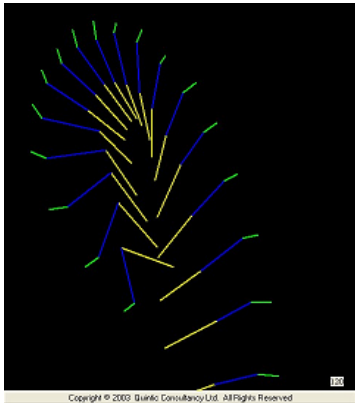
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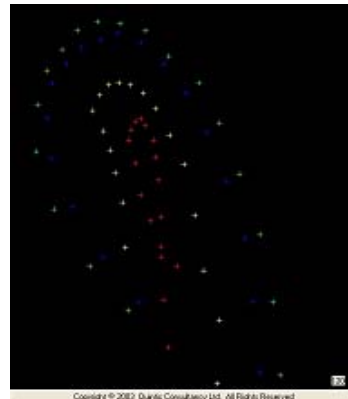
- 3) Open the Animation Window. Scroll to frame 117. These buttons are used in various combinations to display the digitisation trace in this window.



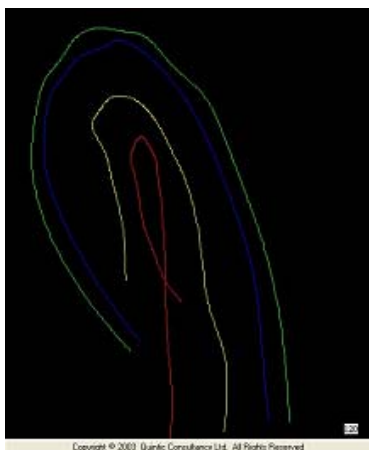
- (i) Which buttons are used in combination to create the following pictures?  
(Hint: Take note of the frame number in the bottom right hand corner of each animation)



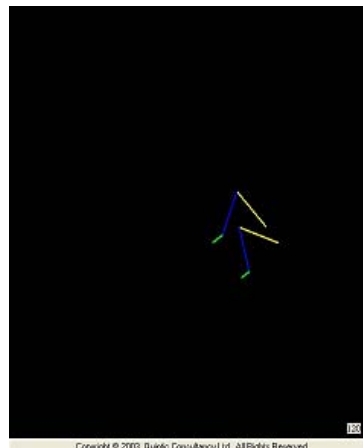
a)



b)



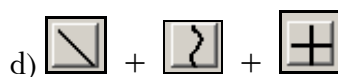
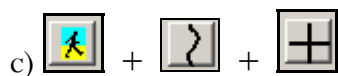
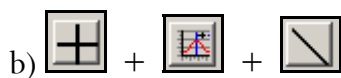
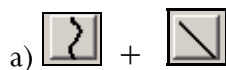
c)



d)

(4)

- (ii) In the Animation Window create images using the following combinations of tools. Each time save it as a JPEG:



- (iii) In Microsoft Word, open all four JPEGs you have just created in part (ii) of this question. Adjust their sizes to ensure they all fit on one page.
  - (iv) Type in the title **‘Animations of Trampolinist’** and type your name at the top of the page.
- (6)

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Using the video **‘No Twist Side View’** from the trampoline folder

Open the Analysis Window by clicking on this button



- 4) When you press **‘Play’** in the main window what happens in the Analysis Window?

.....

.....

.....

.....

.....

(1)

- 5) Answer the following questions by holding the cursor over the relevant points on the graph

**Use absolute measurements for distances.**

- a) What is the horizontal distance of the toe at frame 119?.....
- b) What is the horizontal distance of the knee at frame 155? .....
- c) What is the velocity of the hip at frame 152?.....
- d) What is the velocity of the knee at frame 167?.....
- e) What is the horizontal distance of the ankle at frame 146?.....
- f) What is the velocity of the toe at frame 128?.....

(6)

- 6) Select **'Save results'** from the menu across the top of the analysis window and then 'Save results as an Excel file' from the drop-down menu.

Open Microsoft Excel from your desktop and open the results you just saved.

Use these results to answer the following questions:

**Use absolute measurements for distances.**

- (i) What is the horizontal distance of the right toe at frame 116?  
.....
- (ii) What is the horizontal distance of the right hip at frame 167?  
.....
- (iii) What is the horizontal distance of the right ankle at frame 149?  
.....
- (iv) What is the horizontal distance of the right knee at frame 131?  
.....
- (v) What is the vertical distance of the right ankle at frame 116?  
.....
- (vi) What is the vertical distance of the right toe at frame 134?  
.....
- (vii) What is the vertical distance of the right hip at frame 158?  
.....
- (viii) What is the vertical distance of the right knee at frame 167?  
.....

(8)  
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