

# Best Practice: CLINICAL

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## ***Key points***

- Use **Pro**:
  - For detailed analysis and feedback.
  - To make customised exercise videos, complete with drawings and voiceovers on the clips to emphasise the key points.
  - To make video notes that includes drawing and voice-overs of your assessment and treatment to give to the client, other appropriate health care professionals or medical funders.
- Use **Timewarp** for feedback to accelerate the learning or re-learning process.
- Use **P&O DATA** for detailed gait analysis when you want all the analysis tools plus a client database and automaticity generated reports.

## ***Introduction***

Video analysis and feedback is like working in clinical practice, it’s a combination of art and science.

The science is not definitive and this is really no surprise given the huge variety of people needing analysis and the vast numbers of movements available to analyse. However, there are some general guidelines that can help anyone wanting to capture, analyse and give feedback to those they are working with.

This document pulls together information from a variety of sources into a collection of clear guidelines. These guidelines should be used in conjunction with good clinical practice.

The Siliconcoach products mentioned in this resource will be:

<b>Pro</b>	Designed for making the process of capturing, presenting, analysing and sharing movement analysis data from video simple, fast and effective.
<b>Timewarp</b>	A delayed playback system designed for use in the session for immediate feedback and minimal disruption.

**P&O DATA**

With the P&O Clinical Movement Data System you can fully engage with your patient during the analysis process by showing them their gait pre and post intervention.

It allows dual video capture so the same motion can be analysed from the sagittal and coronal planes and integrated pre and post fit assessment scales. This means analysis is based on best practice.

All the information that is collected in the system will be used to automatically generate a client report to be shared with appropriate health care providers.

**NOTE:** To find out more go to [www.siliconcoach.com](http://www.siliconcoach.com) and click on **Products** on the top menu.

## Preparation

- Generally you use Pro for general assessment, P&O DATA specifically for gait assessment and Timewarp for rehabilitation.
- If you are using Siliconcoach **Pro** you can get your video 2 ways
  - *Capture live.* This is the fastest way to get video into your computer, however, it does require someone operating the camera and computer. It is the best option in a clinical situation where immediate feedback is essential but if immediate feedback is not essential then the next option may be better.
  - *Import files.* As you don't have to worry about the live capture-to-computer process this is a less stressful option for those new to video analysis. Make sure you keep your clips short, (e.g. about 5-20 seconds). Once you have captured the video to the camera's memory just transfer the files to your computer and then import them in Pro. HD files will retain their HD dimensions.
- If you are using **Timewarp** you are working with live-delayed video so you must be using a camcorder connected to your computer providing a live feed.
- If you are using **P&O DATA** then you will be using a live feed from 2 cameras at the same time. This software has very limited import facilities.
- Light is the biggest factor in getting a good image. If your clip looks blurred it is not the software, set your camera to a higher shutter speed or to Sports Mode and boost the lighting.  
To find out more information go to [www.siliconcoach.com](http://www.siliconcoach.com) and click on **Support** on the top menu then look on any of the Pro, Timewarp or P&O DATA support pages for the How to get good video resource.
- Use a tripod and set it at height equal to the middle of the total height of the movement you are studying.
- You need to make sure there is easy access to the systems. Some clinics have a computer and camera dedicated to assessment using Pro and one in the rehabilitation area dedicated to Timewarp and this works very well. Generally if people have to get the system out of a cupboard and set it up they will not use it.
- Set the computer screen in a position where the client can see it without having to move too much.
- If you want to take distance or speed measurements off the video you will need an object of a known length (calibration scale) in the same plane as the movement and the same distance from the camera as the movement.
- To minimise perspective error you should capture from right angles to the movement or in line with the movement.
- If you want to measure angles and distances, position the camera back far enough so you don't have to pan the camera. You can pan the camera if you are only 'eyeballing' the movement or using time measurements.
- You will need stable something to put the computer on.
- Generally a laptop is the most versatile type of computer.
- For more information go to [www.siliconcoach.com](http://www.siliconcoach.com) , click on **Solutions** on the top menu and look for the **Clinical** option.

## General Movement Analysis

<b>What</b>	<b>Pro</b> (More information at <a href="http://www.siliconcoach.com">www.siliconcoach.com</a> and click on <b>Products</b> from the top menu)
<b>Why</b>	<ul style="list-style-type: none"> <li>• Provide objective assessment.</li> <li>• You owe it to your clients to optimize the rehabilitation process by utilizing the most illustrative feedback you can.</li> <li>• Show your clients what you are seeing and why treatment is needed.</li> <li>• Take screen shots of your analysis for your electronic notes or print hardcopies for your paper records.</li> <li>• Save analysis for future consultation.</li> <li>• Capture video 'live' from your video camera and provide feedback on-the-spot.</li> <li>• 'One click' from video capture to analysis.</li> <li>• 50/60 images per second of video footage allows you to pick up subtleties the naked eye can miss (standard video is 25/30 images per second).</li> <li>• Highlight key points in a video by drawing directly on-screen.</li> <li>• Synchronise multiple video clips for side-by-side or overlaid comparison.</li> <li>• Measure key events using the time, angle, distance and speed tools.</li> <li>• Build a presentation with simple-to-use templates.</li> <li>• Record verbal and visual feedback over the top of a video, save and send via email.</li> </ul>
<b>How</b>	<ul style="list-style-type: none"> <li>• You need to video clips to use in your analysis. These can be captured from a live feed or imported from the camera.</li> <li>• Generally you should only capture 5 to 10 second clips as you are capturing one skill not a whole series of skills. For example you would capture <u>one</u> movie clip for <u>each</u> jump, bend, lift, rotation, throw, etc. This keeps the video files at a manageable size and gives you much more flexibility for future analysis.</li> <li>• You could use the Dual Screen feature in Pro to show video clips of the client performing the skill before and after the intervention for a direct comparison. The intervention could be an orthotic or a physiotherapy, osteopathic or chiropractic treatment session for example.</li> <li>• You might draw a few lines to highlight body position differences between your clips.</li> <li>• Move from just looking at their general form to include specifics, for example the relative position of each limb, the centre of mass relative to the base of support, the timing of segments, the range of motion, the quality of the movement, etc.</li> </ul>

	<ul style="list-style-type: none"> <li>You might measure a few basic angles. Make sure the angles you measure are in the plane of the camera. You must remember that there is more than one way to perform the same skill and there are also errors in the measuring process so don't get too focused on numbers. Use them as part of the analysis but not all of it.</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li><b>Back bends:</b> Back pain is a huge cost to the patient, insurers, employers and the community in general. Video analysis allows you to show them what they looked like before the treatment compared to after which helps in the patient's compliance for on-going treatments and exercises. It also provides evidence to the effectiveness of the treatment.</li> <li><b>Running:</b> The client runs on the treadmill and you can capture their lower body mechanics in close-up detail using the video camera. Once in the software you can slow this fast movement down to frame by frame accuracy, make your diagnosis and educate the client as to what you are going to do and why.</li> <li><b>Lifts:</b> Incorrect lifting techniques contribute to back pain, using video analysis you can show the client how they lift and what they need to do to lift correctly. Once they are doing that you can compare before versus after to reinforce the learning.</li> <li><b>Sport specific skills:</b> With video analysis you can compare the technique of your patient to that of an uninjured player to see if they are attaining the required body positions and reaching the required speeds for that sport at that level. Too often rehabilitation programmes do not assess the athlete at full competition intensity before giving them the all-clear to return to sport.</li> <li><b>Work specific skills:</b> You can use video analysis in workplace assessments to look at body angles, lifting heights, carrying distances, repetition and the very important variable, speed. So often workplace assessments do not take into account the speed of the task. Speed, like body position, greatly influences the loads on the body during manual labour tasks.</li> </ul>

## Gait Analysis

<b>What</b>	<b>P&amp;O DATA</b> (More information at <a href="http://www.siliconcoach.com">www.siliconcoach.com</a> and click on <b>Products</b> from the top menu)
<b>Why</b>	<ul style="list-style-type: none"> <li>• Provide objective assessment.</li> <li>• You owe it to your clients to optimize the rehabilitation process by utilizing the most illustrative feedback you can.</li> <li>• Show your clients what you are seeing and why treatment is needed.</li> <li>• Client database.</li> <li>• It is a very simple process to get from the Home screen through capturing a video and get to the analysis screen (just 2 mouse clicks!).</li> <li>• 50/60 images per second of video footage allows you to pick up subtleties the naked eye can miss (standard video is 25/30 images per second).</li> <li>• Dual HD capture is now an option but requires specific highly spec'd computer. Contact <a href="mailto:sales@siliconcoach.com">sales@siliconcoach.com</a> for more details on this option.</li> <li>• Highlight key points in a video by drawing directly on-screen.</li> <li>• Synchronise multiple video clips for side-by-side or overlaid comparison.</li> <li>• Measure key events using the time, angle, distance and speed tools.</li> <li>• The system automatically generates reports based on your analysis.</li> <li>• Save the analysis in that client's area in the database for future consultations.</li> </ul>
<b>How</b>	<ul style="list-style-type: none"> <li>• Generally you should only capture 5 to 20 second clips as you are capturing one example of their gait not a whole series of examples. For example you could capture them walking away/past (right side) the cameras then then toward/past (left side) the cameras as one clip. This keeps the files at a manageable size and gives you much more flexibility for future analysis.</li> <li>• You could use the Dual Screen feature to show video clips of the client performing the skill before and after the intervention for a direct comparison. The intervention could be an orthotic, prosthetic or a physiotherapy, osteopathic or chiropractic treatment session for example.</li> <li>• You might draw a few lines to highlight body position differences between your clips.</li> <li>• Move from just looking at their general form to include specifics, for example the relative position of each limb, the centre of mass relative to the base of support, the timing of segments, the range of motion, the quality of the movement, etc.</li> <li>• You might measure a few basic angles. Make sure the angles you</li> </ul>

	<p>measure are in the plane of the camera. You must remember that there is more than one way to perform the same skill and there are also errors in the measuring process so don't get too focused on numbers. Use them as part of the analysis but not all of it.</p> <ul style="list-style-type: none"> <li>• Save the analysis in that client's area in the database for future consultations.</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• <b>After ankle injury:</b> Create a client in the database and then video and analyse them as soon as they can put some weight on the affected foot. Intervene with standard treatment and re-video every week. Compare the videos side by side to show progress and also to identify what aspects of their gait still need attention so as to return the client to a normal walking pattern.</li> <li>• <b>Orthotics:</b> Create a client in the database and then video and analyse them before you intervention. Place your orthotic in the shoe and re-video. Continue to re-video as they adapt to it and use the analysis from the videos as part of your progression toward normal gait.</li> <li>• <b>Prosthetic:</b> Create a client in the database and then video and analyse them in their current prosthetic and/or using crutches. Make a decision on the best prosthetic for them and then fit it. Re-video and analyse immediately and make the appropriate changes to the fitting. Re-video at regular intervals as they learn to use their new device. Use the system to automatically create a report of the changes over time for other appropriate health care providers and insurers.</li> </ul>

## Treatment

### Earlier in the Rehabilitation Process

<b>What</b>	<b>Timewarp</b> (More information at <a href="http://www.siliconcoach.com">www.siliconcoach.com</a> and click on <b>Products</b> from the top menu)
<b>Why</b>	<ul style="list-style-type: none"> <li>• Fun and engaging for clients.</li> <li>• You owe it to your clients to optimize the rehabilitation process by utilizing the most illustrative feedback you can.</li> <li>• After injury, joint position sense is disturbed, Timewarp allows patients to visually check if their movements are what they thought they were.</li> <li>• Allows clients to study their own technique and learn to self-assess.</li> <li>• Easy to use, just set the required time delay and leave it.</li> <li>• Patients can train on their own using technique guidelines prepared by the therapist.</li> <li>• Save and export clips to Siliconcoach Pro for detailed analysis.</li> </ul>
<b>How</b>	<ul style="list-style-type: none"> <li>• Set the Timewarp delay ('Warp') to an appropriate period, usually about 5 – 15 seconds. The great feature here is you do not need to touch the computer at all from now-on thereby minimising disruptions to the treatment process.</li> <li>• Make sure the client can see the computer screen easily.</li> <li>• <b>Early in the rehab process:</b> <ul style="list-style-type: none"> <li>○ Let them see what they did and perhaps offer some simple feedback and suggestions. Keep it simple.</li> <li>○ They will probably want to look at every attempt, let them.</li> <li>○ You could use the Exemplar feature in Timewarp to show clips of the skill being done correctly. You might get them to watch the 'expert' and then watch themselves.</li> </ul> </li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• <b>Back bends:</b> Back pain is a huge cost to the patient, insurers, employers and the community in general. Video analysis allows you to show them what they looked like before the treatment compared to after which helps in the patient's compliance for on-going treatments and exercises. It also provides evidence to the effectiveness of the treatment.</li> <li>• <b>Lifts:</b> Incorrect lifting techniques contribute to back pain, using video analysis you can show the client how they lift and what they need to do to lift correctly. Therefore show them the correct lift and then get them doing the correct lift and watching it on screen. Set them the task of repeating the lift and keeping good form. Repeat with loads of difference size and/or weight.</li> <li>• <b>Sport specific skills:</b> With video analysis you can compare the technique of your patient to that of an uninjured player to see if they are attaining the required body positions and reaching the required speeds for that sport at that level. Too often rehabilitation programmes do not assess the athlete at full competition intensity</li> </ul>

before giving them the all-clear to return to full competition.

- **Work specific skills:** You can use video analysis in workplace assessments to look at body position, lifting heights, carrying distances, repetition and the very important variable, speed. So often workplace assessments do not take into account the speed of the task. Speed, like body position, greatly influences the loads on the body during manual labour tasks.

## Later in the Rehabilitation Process

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<b>How</b>	<ul style="list-style-type: none"> <li>• Set the Timewarp delay ('Warp') to an appropriate period, usually about 5 – 15 seconds. The great feature here is you do not need to touch the computer at all from now on minimising disruptions to the treatment process.</li> <li>• Make sure the client can see the computer screen easily.</li> <li>• <b>Later in the rehab process:</b> <ul style="list-style-type: none"> <li>○ Don't get them to look at each and every attempt, reduce the frequency to perhaps one in every 2-3 attempts and focus on the client 'feeling' the movement internally and self-critiquing their technique before they check it on the screen.</li> <li>○ The goal is to eventually 'wean' them off the video feedback completely and so they learn to feel their proprioceptive input as they perform their movements.</li> </ul> </li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• <b>Back bends:</b> Back pain is a huge cost to the patient, insurers, employers and the community in general. Video analysis allows you to show them what they looked like before the treatment compared to after which helps in the patient's compliance for on-going treatments and exercises. It also provides evidence to the effectiveness of the treatment.</li> <li>• <b>Lifts:</b> Incorrect lifting techniques contribute to back pain, using video analysis you can show the client how they lift and what they need to do to lift correctly. Therefore show them the correct lift and then get</li> </ul>

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## Individual Rehabilitation

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	<p>frequency to perhaps one in every 2-3 attempts and focus on the client 'feeling' the movement internally and self-critiquing their technique before they check it on the screen.</p> <ul style="list-style-type: none"> <li>○ The goal is to eventually 'wean' them off the video feedback completely and learn to feel their proprioceptive input as they perform their movements.</li> </ul>
<b>Examples</b>	<ul style="list-style-type: none"> <li>• <b>Back bends:</b> Back pain is a huge cost to the patient, insurers, employers and the community in general. Video analysis allows you to show them what they looked like before the treatment compared to after which helps in the patient's compliance for on-going treatments and exercises. It also provides evidence to the effectiveness of the treatment.</li> <li>• <b>Lifts:</b> Incorrect lifting techniques contribute to back pain, using video analysis you can show the client how they lift and what they need to do to lift correctly. Therefore show them the correct lift and then get them doing the correct lift and watching it on screen. Set them the task of repeating the lift and keeping good form. Repeat with loads of difference size and/or weight.</li> <li>• <b>Sport specific skills:</b> With video analysis you can compare the technique of your patient to that of an uninjured player to see if they are attaining the required body positions and reaching the required speeds for that sport at that level. Too often rehabilitation programmes do not assess the athlete at full competition intensity before giving them the all-clear to compete.</li> <li>• <b>Work specific skills:</b> You can use video analysis in workplace assessments to look at body angles, lifting heights, carrying distances, repetition and the very important variable, speed. So often workplace assessments do not take into account the speed of the task. Speed, like body position, greatly influences the loads on the body during manual labour tasks.</li> </ul>