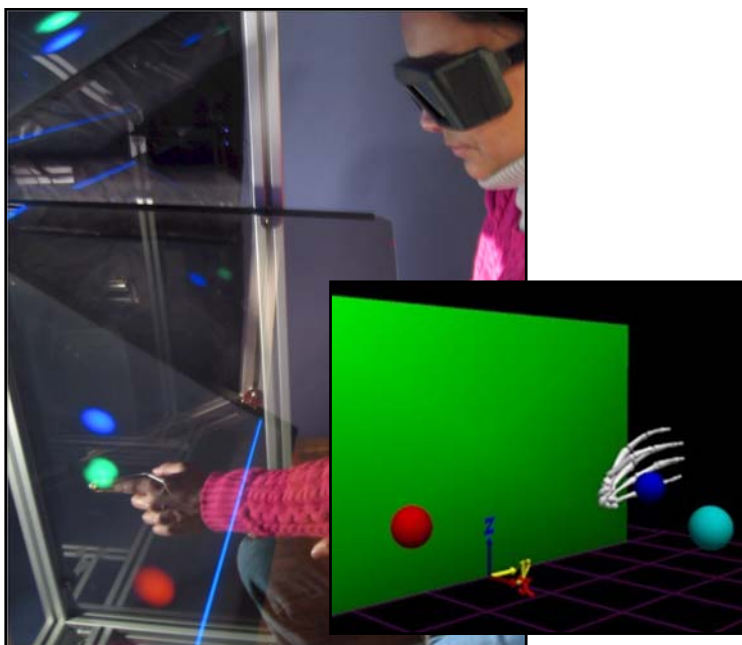


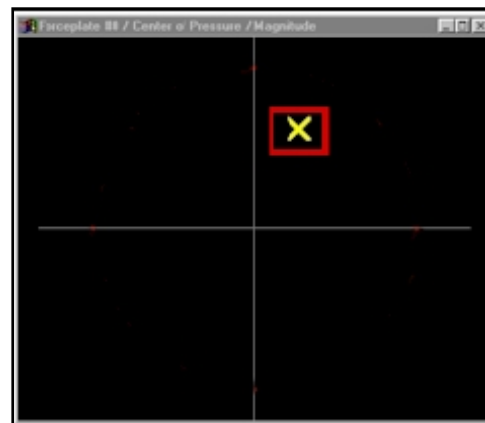
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Biofeedback with Virtual Reality



- Conduct motor-control and stimulus response studies with audio and visual cues using either a 2-D display or 3-D immersive stereoscopic display.
- Generate discrete or randomized targets.
- Provide visual and audio “pacing” signals for timed exercises.
- Encourage extended range of motion with “success” tones when target values are achieved.
- Monitor timing and existence of muscle recruitment with EMG feedback.
- Optimize balance strategies by tracking body segment center of mass and forceplate center of pressure.
- Record and save all data collected during the biofeedback trial.
- Display data selected from intuitive drop-down menus or defined by the user with standard math notation. Export all raw or processed data for further processing in other software.

The subject in the above left image is reaching for virtual objects presented in the stereoscopic immersive display. Alternatively, 3-D targets, objects and a “chasing cursor” can be presented using a 2-D display, as seen in the above right image.



Biofeedback Parameters

X-Axis variable

Orthopedic angle: Cervical Flex

Segment data: Head 1 Sensor Position World

A/D board data: Board #0 Channel #0

Forceplate data: Forceplate #0 World Force

User-defined data: S V M HandSensorX↑ 1.10

Data range: from -1 to 1

Y-Axis variable

Enabled

The image above is a 2-D balance exercise with the subject encouraged to extend his limit of stability. The red box is a target established by the clinician while the yellow X is the center of pressure generated by the subject while standing on a force plate. A “success” tone sounds when the subject overlays the X with the box.

The image above depicts a portion of the biofeedback dialog used to setup an experiment. Here the user has selected to perturbate the display of the hand's position in the x axis by multiplying its sensor position by 1.10. Additional dialog entries control the position of y and z; the location and color of targets; the logic flow of the experiment; and data to be displayed during playback.

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