… Pedana di forza ed accelerometri …

Tra diagnosi e Terapia

Aula polifunzionale COMI - Luino

dr Manelli Alessandro
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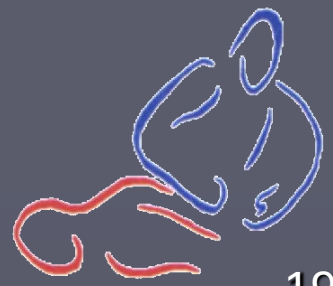
ASL1 Imperiese



Esercizi di Cawthorne e Cooksey
(Hecker, Haug e Herndon, 1974; Dix, 1979, 1984; Norré e De Weerdt, 1980a, 1980b….)

Riabilitazione Strumentale

Comparison of Cawthorne-Cooksey Exercises and Sinusoidal Support Surface Translations to Improve Balance in Patients With Unilateral Vestibular Deficit

Stefano Corna, MD, Antonio Nardone, MD, PhD, Alessandro Prestinari, MD, Massimo Galante, MD, Margherita Grasso, PT, Marco Schieppati, MD

ABSTRACT. Corna S, Nardone A, Prestinari A, Galante M, Grasso M, Schieppati M. Comparison of Cawthorne-Cooksey exercises and sinusoidal support surface translations to improve balance in patients with unilateral vestibular deficit. Arch Phys Med Rehabil 2003;84:1173-84.

Objective: To compare the effectiveness of vestibular rehabilitation by using Cawthorne-Cooksey exercises with that of instrumental rehabilitation.

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Setting: Division of physical therapy and rehabilitation at a scientific institute in Italy.

Participants: Patients (Cawthorne-Cooksey, n=17; instrumental rehabilitation, n=15) with a complete or incomplete unilateral vestibular lesion due to ischemic, inflammatory, cranial nerve VIII sectioning, or unknown cause.

Interventions: Cawthorne-Cooksey exercises or instrumental rehabilitation training consisting of standing with eyes open (EO) or closed (EC) on a platform moving, relative to the subjects, in the anteroposterior (AP) or mediolateral direction, at a sinusoidal translation frequency of 0.2 or 0.6Hz; training sessions for both interventions were twice daily, 30 minutes per session, for 5 days.

Main Outcome Measures: Body sway and subjective score of sway during quiet stance with EO or EC, with feet 10cm apart (FA) or together (FT); the standard deviation of the AP displacement of the malleolus, hip, and head during AP platform translations; the Dizziness Handicap Inventory (DHI); and performance-oriented evaluation of balance and gait (according to Tinetti).

Results: Both interventions improved patients' balance. Under each postural and visual condition, both groups showed reduction in body sway, and the post rehabilitation sway values approached those observed in normal subjects; improvement was significantly better for instrumental rehabilitation under FA EO, FA EC, and FT EC conditions. All patients reported a subjective feeling of increased steadiness. Sway recorded 1 month before treatment did not differ from that at the start of treatment. The follow-up evaluation showed persistence of effect. Parallel to the improved stability, a decrease in the SD of the displacement of hip and head in balancing on the movable platform was present in both groups; improvement was better in the instrumental rehabilitation group than the Cawthorne-Cooksey group under the EC condition. Balance and gait assessment improved to the same extent in both groups. Scores on the physical, functional, and emotional questions of the DHI improved significantly in both groups after treatment, but to a larger extent in the instrumental rehabilitation patients.

Conclusions: Both Cawthorne-Cooksey and instrumental rehabilitation are effective for treating balance disorders of vestibular origin. Improvement affects both control of body balance and performance of activities of daily living. The larger decrease in body sway and greater improvement of DHI after instrumental rehabilitation suggests that it is more effective than Cawthorne-Cooksey exercises in improving balance control.

Key Words: Balance; Dizziness; Posture; Rehabilitation; Vestibule.

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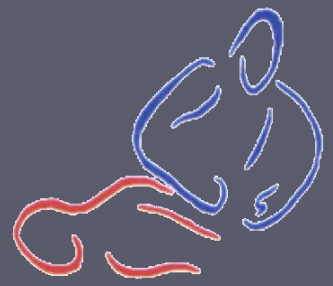
0003-9993/03/8408-7412$30.00/0
doi:10.1053/apmr.2003.50130-8

Vertigini / Disequilibrio

Terapia Manuale / Manipolazione cervicale



Riabilitazione Strumentale

Esercizi di Cawthorne e Cooksey

Objective: Confrontare l'efficacia della riabilitazione vestibolare utilizzando esercizi Cawthorne-Cooksey con la riabilitazione strumentale.

Participants: I pazienti (Cawthorne-Cooksey, n17; riabilitazione strumentale, n15) con una lesione unilaterale vestibolare a causa ischemica, completa o incompleta, di origine infiammatoria, da lesione del VIII nervo cranico o per causa sconosciuta.

Comparison of Cawthorne-Cooksey Exercises and Sinusoidal Support Surface Translations to Improve Balance in Patients With Unilateral Vestibular Deficit

Stefano Cacna, MD, Antonio Nardone, MD, PhD, Alessandro Prestinari, MD, Massimo Galante, MD, Margherita Grasso, PT, Marco Schieppati, MD

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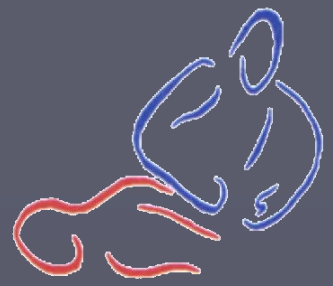

Riabilitazione Strumentale

Esercizi di Cawthorne e Cooksey

Interventions: Gli esercizi di Cawthorne-Cooksey o quelli di riabilitazione strumentale sono stati eseguiti in piedi con gli occhi aperti (EO) o chiusi (CE), su una piattaforma mobile, in direzione antero-posteriore (AP) o medio-laterale, ...;
Sessioni di lavoro per entrambi gli interventi sono stati: due volte al giorno, 30 minuti per sessione, 5 giorni.

Comparison of Cawthorne-Cooksey Exercises and Sinusoidal Support Surface Translations to Improve Balance in Patients With Unilateral Vestibular Deficit

Stefano Cocna, MD, Antonio Nardone, MD, PhD, Alessandro Prestinari, MD, Massimo Galante, MD, Margherita Grasso, FT, Marco Schieppati, MD

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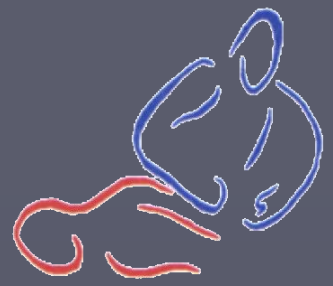

Riabilitazione Strumentale

Esercizi di Cawthorne e Cooksey

Conclusions: Entrambi i protocolli (Cawthorne-Cooksey e riabilitazione strumentale) sono efficaci per il trattamento di disturbi dell'equilibrio di origine vestibolare.
I miglioramenti riguardano sia il controllo dell'equilibrio che le attività della vita quotidiana.
<u>La maggiore diminuzione in oscillazione ed maggiore miglioramento della DHI dopo la riabilitazione strumentale suggerisce che è più efficace degli esercizi Cawthorne-Cooksey nel migliorare il controllo dell'equilibrio.</u>

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0003-9993/03/8408-7412$30.00/0
doi:10.1016/S0003-9993(03)00130-8

EUR J PHYS REHABIL MED 2010;46:159-68

Effects of traditional physical training and visual computer feedback training in frail elderly patients. A randomized intervention study

D. K. HAGEDORN, E. HOLM

Rehabilitation Medicine
Thomas Jefferson University, Philadelphia, USA

Background. Physical training to increase muscle strength and balance is considered useful for prevention of falls in older people.
Aim. This study compares conventional balance training with visual computer feedback training.
Design. This was a randomized controlled 12-week intervention trial with pre- and post-training evaluations.
Setting. Out-patients referred to a geriatric falls and balance clinic.
Population. Thirty-five patients were randomized into two training groups.
Methods. Both groups received progressive resistance muscle strength training and physical fitness training. Additionally, one group received traditional balance training and the other group received computer feedback balance training. Strength, physical endurance, balance and falls efficacy scale scoring were assessed before and after end of training.

closed eyes showed a significant increase (80%). No increase occurred in the computer balance training group. However, the computer feed-back training group showed a marked improvement that was up to 400% in the training specific performance.
Conclusion. Elderly frail patients were able to increase muscle strength and physical endurance. A limited improvement was seen in the static balance tests. The computer feedback group showed a remarkable increase in training specific performance.
Clinical Rehabilitation Impact.

ORIGINAL ARTICLE

Comparing Biofeedback With Active Exercise and Passive Treatment for the Management of Work-Related Neck and Shoulder Pain: A Randomized Controlled Trial

Chao Ma, PhD, MD, Grace P. Szeto, PhD, Tiebin Yan, PhD, MD, Shaoling Wu, PhD, MD, Caina Lin, BSc, Lijuan Li, BSc

ABSTRACT. Ma C, Szeto GP, Yan T, Wu S, Lin C, Li L. Comparing biofeedback with active exercise and passive treatment for the management of work-related neck and shoulder pain: a randomized controlled trial. Arch Phys Med Rehabil 2011;92:849-58.

Objectives: To compare the effects of biofeedback with those of active exercise and passive treatment in treating work-related neck and shoulder pain.

Design: A randomized controlled trial with 3 intervention groups and a control group.

Setting: Participants were recruited from outpatient physiotherapy clinics and a local hospital.

Participants: All participants reported consistent neck and shoulder pain related to computer use for more than 3 months in the past year and no severe trauma or serious pathology. A total of 72 potential participants were recruited initially, of whom a smaller group of individuals (n=60) completed the randomized controlled trial.

Interventions: The 3 interventions were applied for 6 weeks. In the biofeedback group, participants were instructed to use a biofeedback machine on the bilateral upper trapezius (UT) muscles daily while performing computer work. Participants in the exercise group performed a standardized exercise program daily on their own. In the passive treatment group, interferential therapy and hot packs were applied to the participants' necks and shoulders. The control group was given an education booklet on office ergonomics.

Main Outcome Measures: Pain (visual analog scale), neck disability index (NDI), and surface electromyography were assessed preintervention and postintervention. Pain and NDI were reassessed after 6 months.

Results: Postintervention, average pain and NDI scores were reduced significantly more in the biofeedback group than in the other 3 groups, and this was maintained at 6 months. Cervical erector spinae muscle activity showed significant reductions postintervention in the biofeedback group, and there were consistent trends of reductions in the UT muscle activity.

Conclusions: Six weeks of biofeedback training produced more favorable outcomes in reducing pain and improving muscle activation of neck muscles in patients with work-related neck and shoulder pain.

Key Words: Feedback; Electrical stimulation; Exercise; Neck pain; Rehabilitation; Shoulder pain.

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COMPUTER USE DOMINATES work and permeates home and school environments in modern society. It is estimated that 90% of office workers use computers daily, with 40% reporting use for at least 4 hours per day.[1] Such intensive use can greatly increase the risk of musculoskeletal disorders,[1,2] and indeed, prevalence rates of work-related neck and shoulder disorders have increased considerably among office workers over the past few decades.[2] Among the factors that may influence these disorders is the sustained and increased activity of major stabilizing muscles such as the trapezius in maintaining prolonged static posture.[3]

Although research literature[4-8] has supported the positive effects of exercise training and physical activity in managing musculoskeletal disorders, the underlying mechanisms are still not clear. Prolonged computer work may lead to static muscle tension, and this may contribute to fatiguing or overloading of postural muscles, resulting in pain and degenerative changes in these muscles.[3,6,10] If this is the main cause of work-related neck and shoulder pain, then regular exercise or physical activity should help to relieve pain by alleviating static muscle tension. However, many individuals tend to have fairly fixed postural habits, and they may resume work with the same static posture and muscle tension after taking an exercise break. Work in our laboratory[11] has shown that high levels of trapezius muscle activity are elicited as soon as workers place their hands on the keyboard, even before any work begins. These results suggest that habitual maladaptive motor control patterns are crucial mechanisms contributing to the development of work-related musculoskeletal disorders (WMSDs).

Recent research studies have found that biofeedback can be applied to reduce muscular tension in order to treat

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Supported by a research grant from Hong Kong Polytechnic University (grant no. A-PH8).

Presented to the International Society of Electromyography and Kinesiology, June 16–19, 2010, Aalborg, Denmark.

No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit on the authors or on any organization with which the authors are associated.

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0003-9993/11/9206-0085$36.00/0
doi:10.1016/j.apmr.2010.12.037

List of Abbreviations

ANOVA	analysis of variance
CES	cervical erector spinae
EMG	electromyogram
NDI	Neck Disability Index
RCT	randomized controlled trial
UT	upper trapezius
VAS	visual analog scale
WMSDs	work-related musculoskeletal disorders

Conclusions: Sei settimane di programma con biofeedback produce risultati più favorevoli nel ridurre il dolore e migliorare l'attivazione muscolare dei muscoli del collo in pazienti con cervicalgia e dolore alla spalla.

ACTA OTORHINOLARYNGOLOGICA ITALICA 2010;30:182-189

VESTIBOLOGY

Postural control and risk of falling in bipodalic and monopodalic stabilometric tests of healthy subjects before, after visuo-proprioceptive vestibulo-postural rehabilitation and at 3 months thereafter: role of the proprioceptive system

Controllo posturale e rischio di caduta alle prove stabilometriche bipodalica e monopodalica in soggetti sani prima, dopo e a tre mesi da un trattamento riabilitativo vestibolo-posturale con stimolo visuo-propriocettivo: il ruolo del sistema propriocettivo

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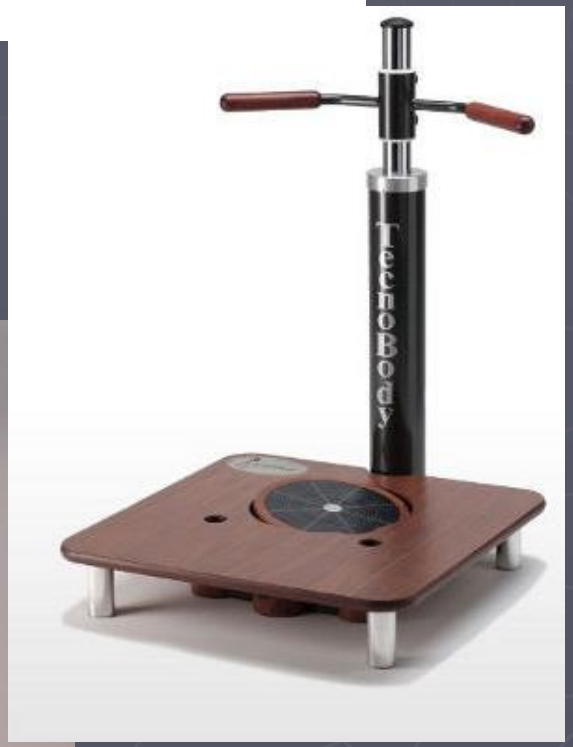
SUMMARY

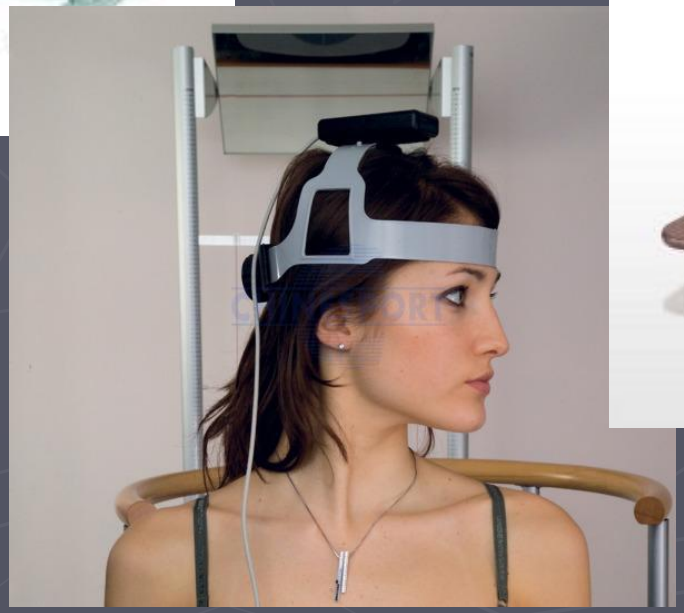
Nine healthy volunteers (6 males, 3 females), mean age 34.5 years (SD = 11.52), underwent a vestibulo-postural rehabilitation cycle with a visuo-proprioceptive-type stimulus. All subjects in the study group were evaluated by means of stabilometric bipodalic and monopodalic tests both before and immediately after treatment, and again 3 month thereafter. The Delos Postural Proprioceptive System®, DPPS (Delos, srl, Turin, Italy), was used in performing these stabilometric tests and in the rehabilitation exercises. The first aim of the study was to evaluate to what extent the functional level of the proprioceptive system was reliable, in healthy subjects, in the control of postural stability; the second was to demonstrate the possibility to increase this level by means of a novel visuo-proprioceptive feedback training; the last was to establish whether or not the increase achieved was permanent. The bipodalic test did not reveal any deficit in posture either before or after rehabilitation. The monopodalic test prior to treatment, with eyes closed, revealed, in 2/3 of the study group, evidence of the risk of falling, expressed as the precautional strategy (8.57 ± 6.18% SD). An increase in the proprioceptive activity, obtained in the subjects examined immediately after the visuo-proprioceptive vestibulo-postural rehabilitation, led, in the monopodalic test, with eyes closed, to a significant reduction in the risk of falling (with the precautional strategy equal to 1.09 ± 2.63% SD, p = 0.004). The monopodalic test, with eyes closed, 3 months after rehabilitation, demonstrated results not unlike those pre-treament with values, therefore, not more significant than those emerging from the pre-treatment test. Thus, from the above-mentioned data, it can be observed that, also in healthy subjects, there may be different levels of postural proprioceptive control related to a high risk of falling. These levels can be maintained constant for a certain period of time, until a significant reduction in the risk of falling is achieved, only if continuously stimulated by appropriate sensorial information.

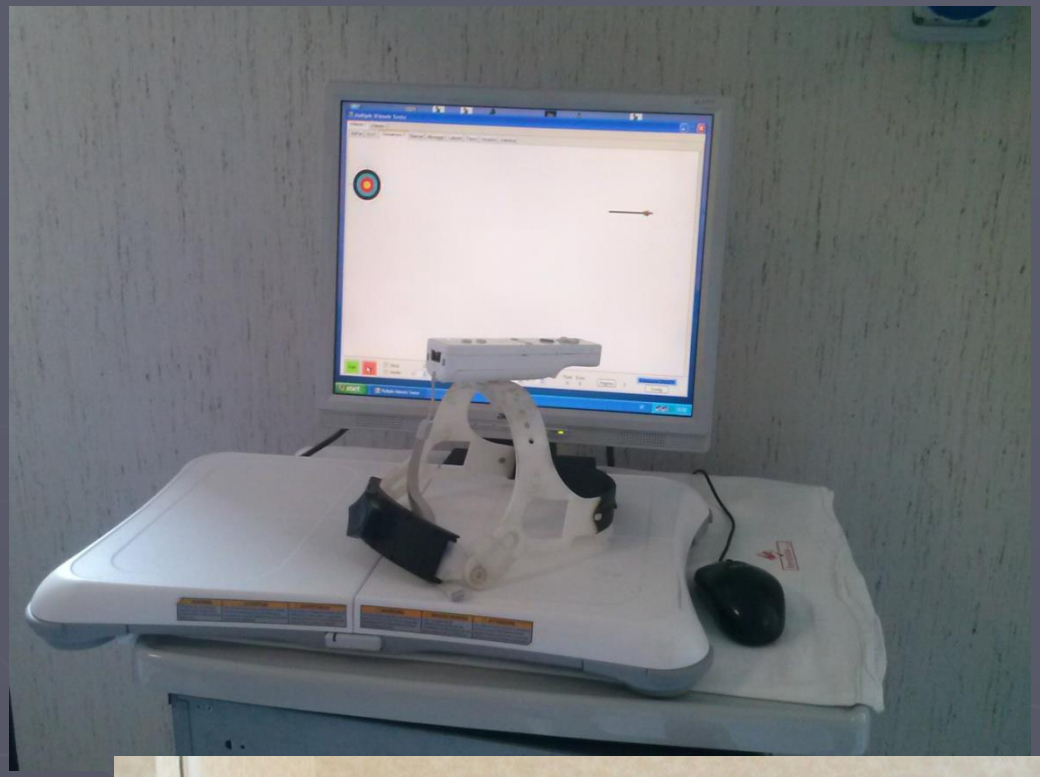
KEY WORDS: Vestibulo-postural rehabilitation • Visuo-proprioceptive feedback • Risk of falling • Double-leg stance • Single-leg stance

Dopo 3 mesi dalla riabilitazione, i valori della strategia precauzionale e del rischio di caduta ***sono tornati ad essere sovrapponibili a quelli ottenuti prima del trattamento.*** Da quanto esposto, risulta come anche nei soggetti sani possa esservi un deficit propriocettivo "sub-clinico", associato ad un elevato rischio di caduta. Gli effetti di questo tipo di programma riabilitativo agirebbero sia sui rifessi propriocettivi che a livello cognitivo, con una riduzione significativa del rischio di caduta e un progressivo miglioramento dell'equilibrio. ***I risultati così ottenuti da un solo ciclo riabilitativo, andrebbero però, per essere mantenuti costanti nel tempo, alimentati da continue ed adeguate informazioni sensoriali.***

zephyr


TecnoBody





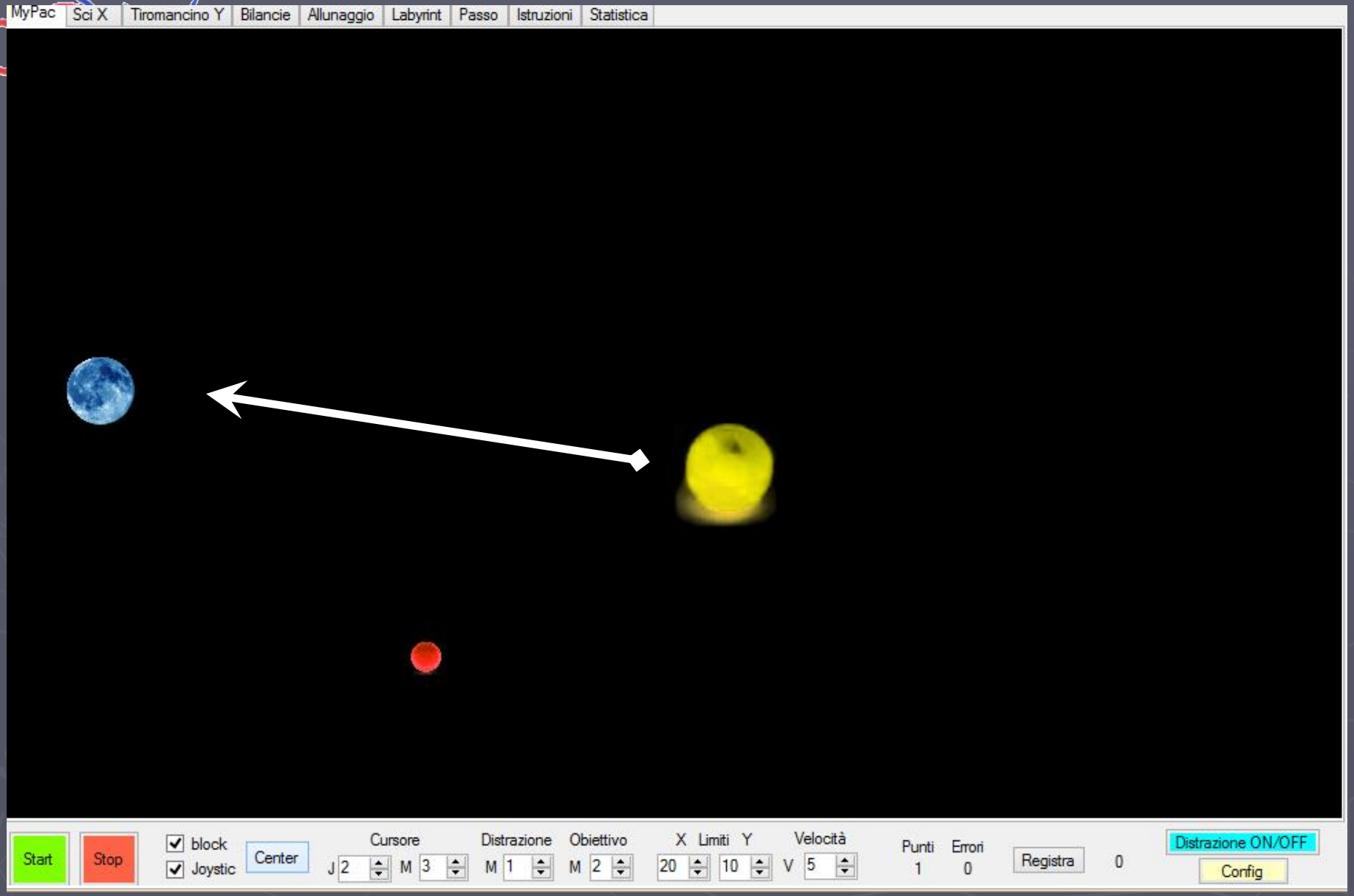
Trattamento Fisioterapico

Prendendo spunto dagli esercizi di Cawthorne e Cooksey
(bed or sitting, sitting, standing)

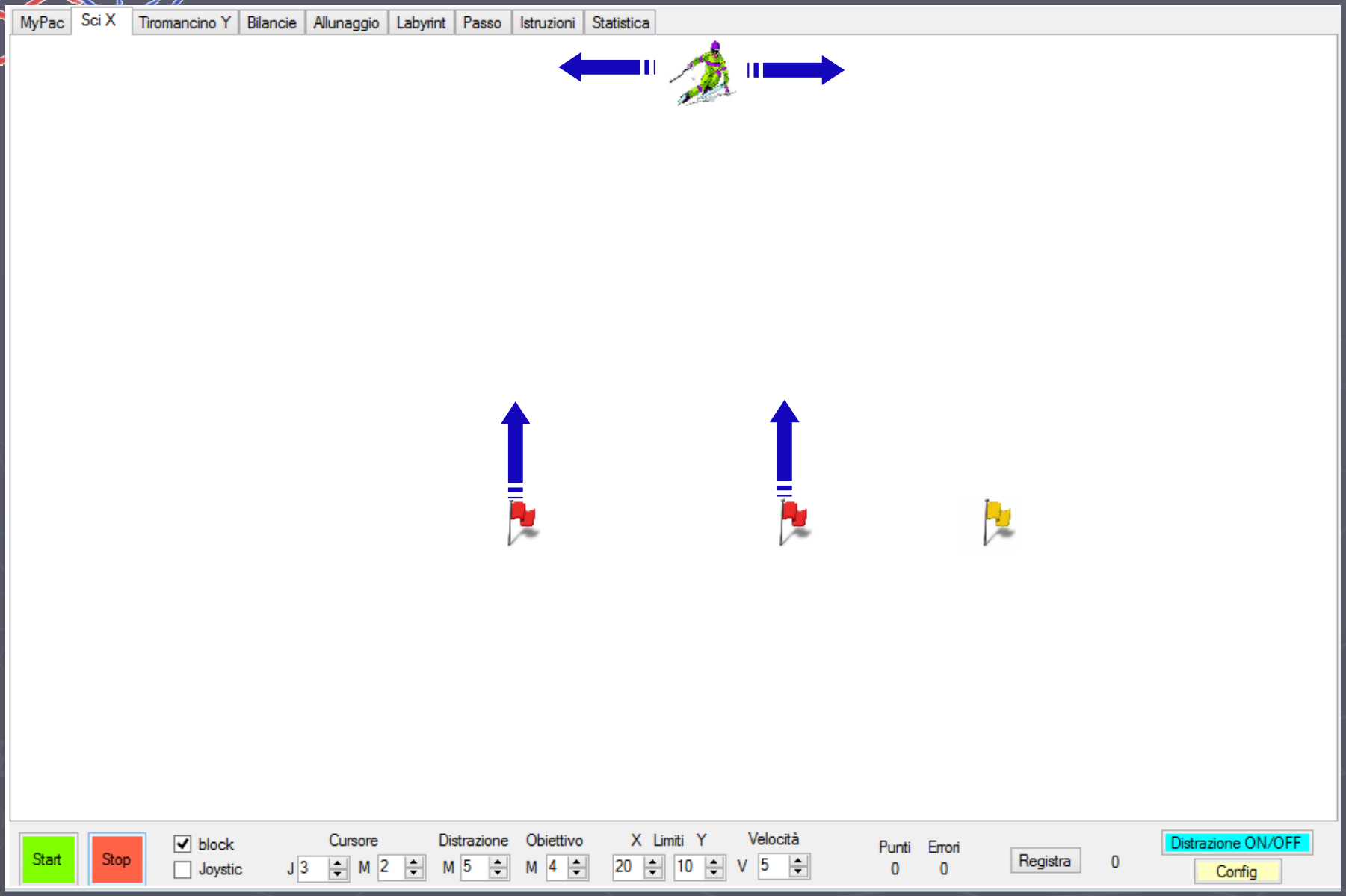
PROTOCOLLO RIABILITATIVO

	FASE 1 0 – 4 giorni	FASE 2 4 – 21 giorni	FASE3 3 – 6 settimane	FASE 4 Oltre 6 settimane
Raggiungimento di cursore fermo	- Sensibilità cursore alta - Area piccola - Occhi aperti /chiusi	- Sensibilità cursore media - Area media - Utilizzo di piani instabili - Occhi aperti / chiusi	- Sensibilità cursore alta - Area massimo ROM - Utilizzo di piani instabili - Occhi aperti / chiusi	- Sensibilità cursore alta - Area massimo ROM - Utilizzo di piani instabili - Occhi aperti / chiusi
Intercettare un obiettivo in movimento		- Sensibilità cursore media - Velocità 1 o 2	- Sensibilità cursore alta - Velocità 2 o 3 - Utilizzo di piani instabili	- Sensibilità cursore alta - Velocità 2 o 3 - Utilizzo di piani instabili
Mantenere il centro		- Sensibilità cursore alta - Solo rotazione (dalla 3° settimana)	- Sensibilità cursore alta - Rotazione - Ante - retroposizioni capo	- Sensibilità cursore alta - Rotazione - Ante - retroposizioni capo - Utilizzo di piani instabili
Seguire un percorso			-Sensibilità cursore bassa - Occhi aperti	- Sensibilità cursore media - Utilizzo di piani instabili - Occhi aperti / chiusi

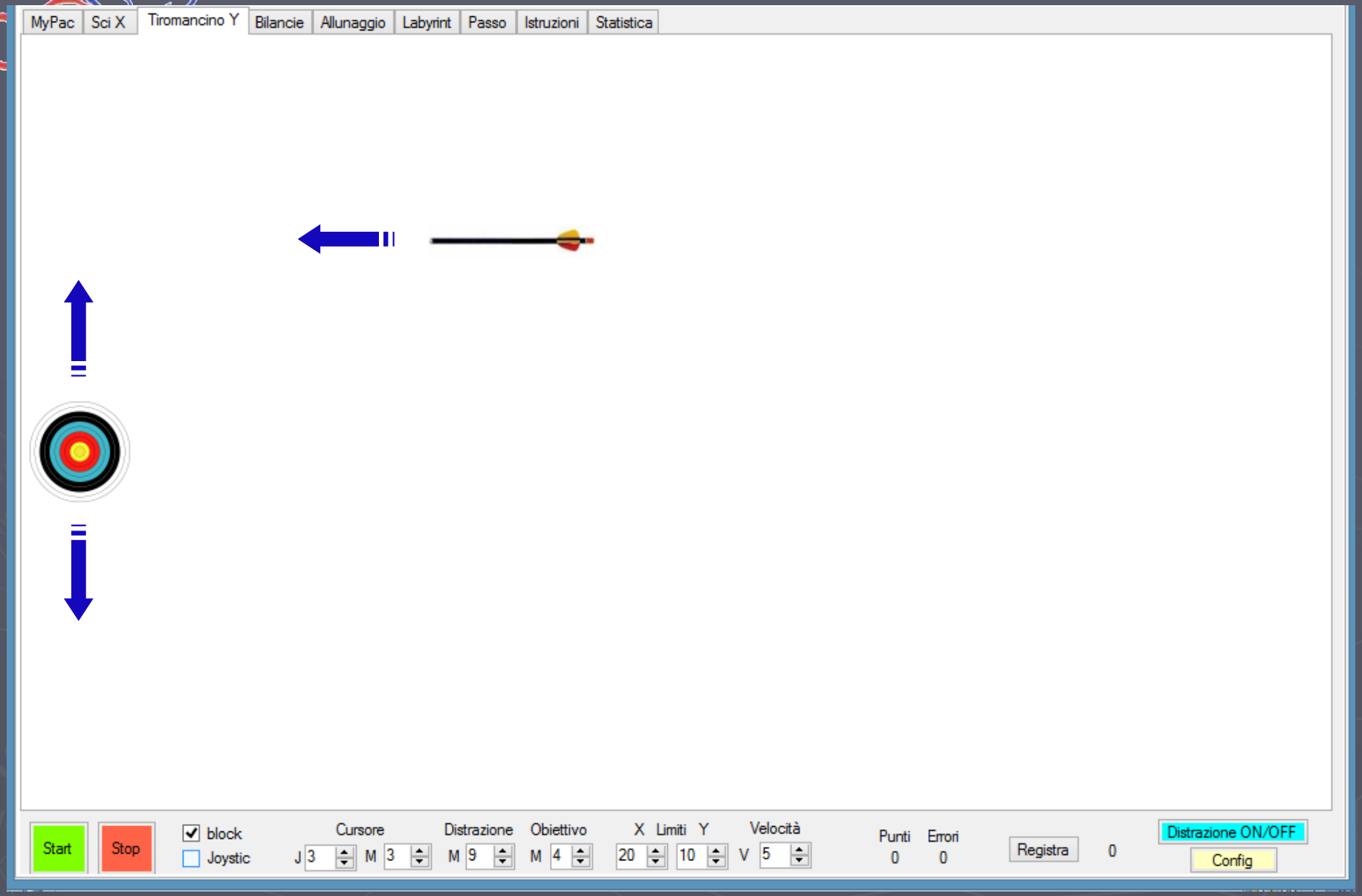
Raggiungimento di cursore fermo



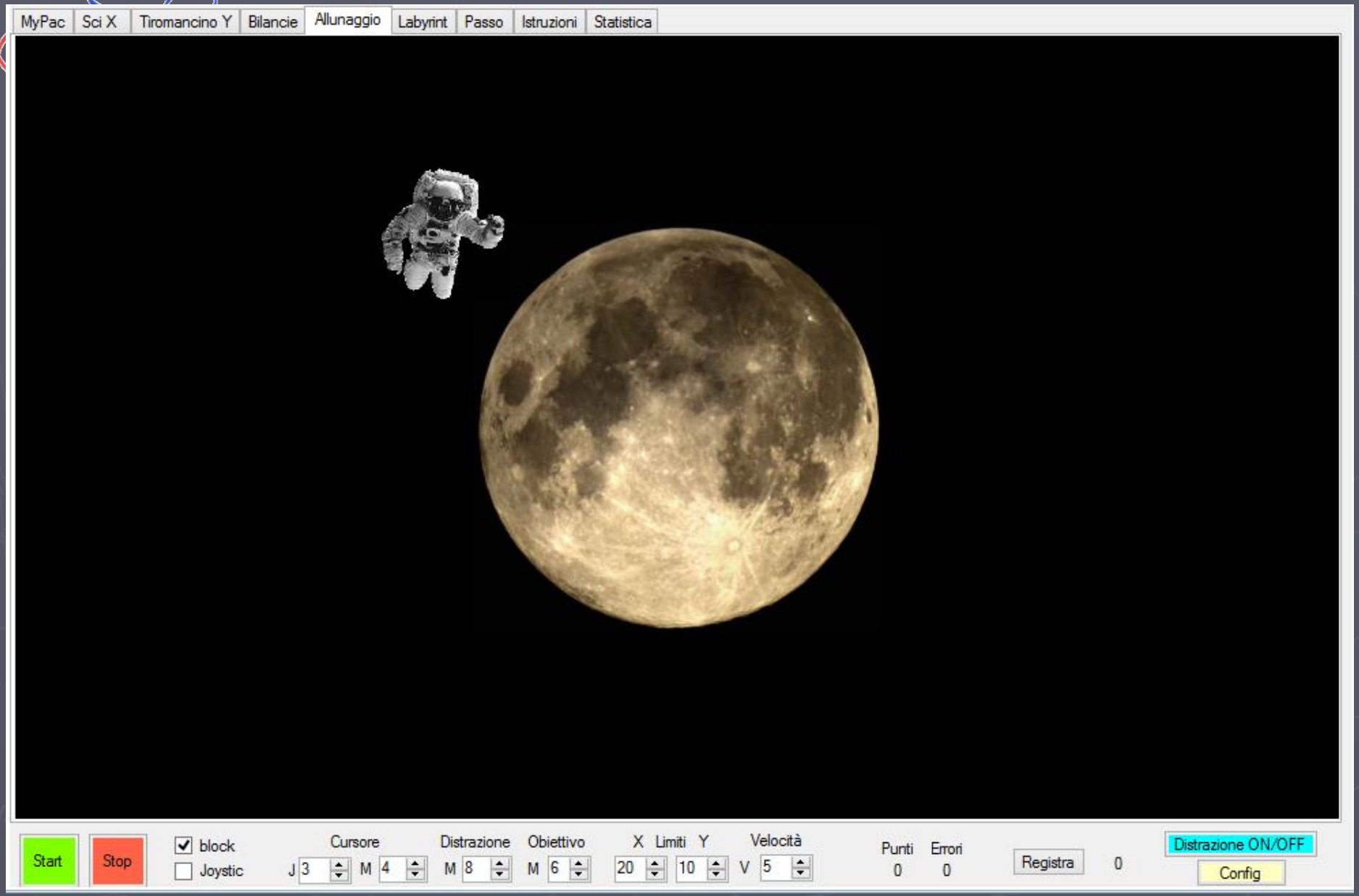
Intercettare obiettivi in movimento



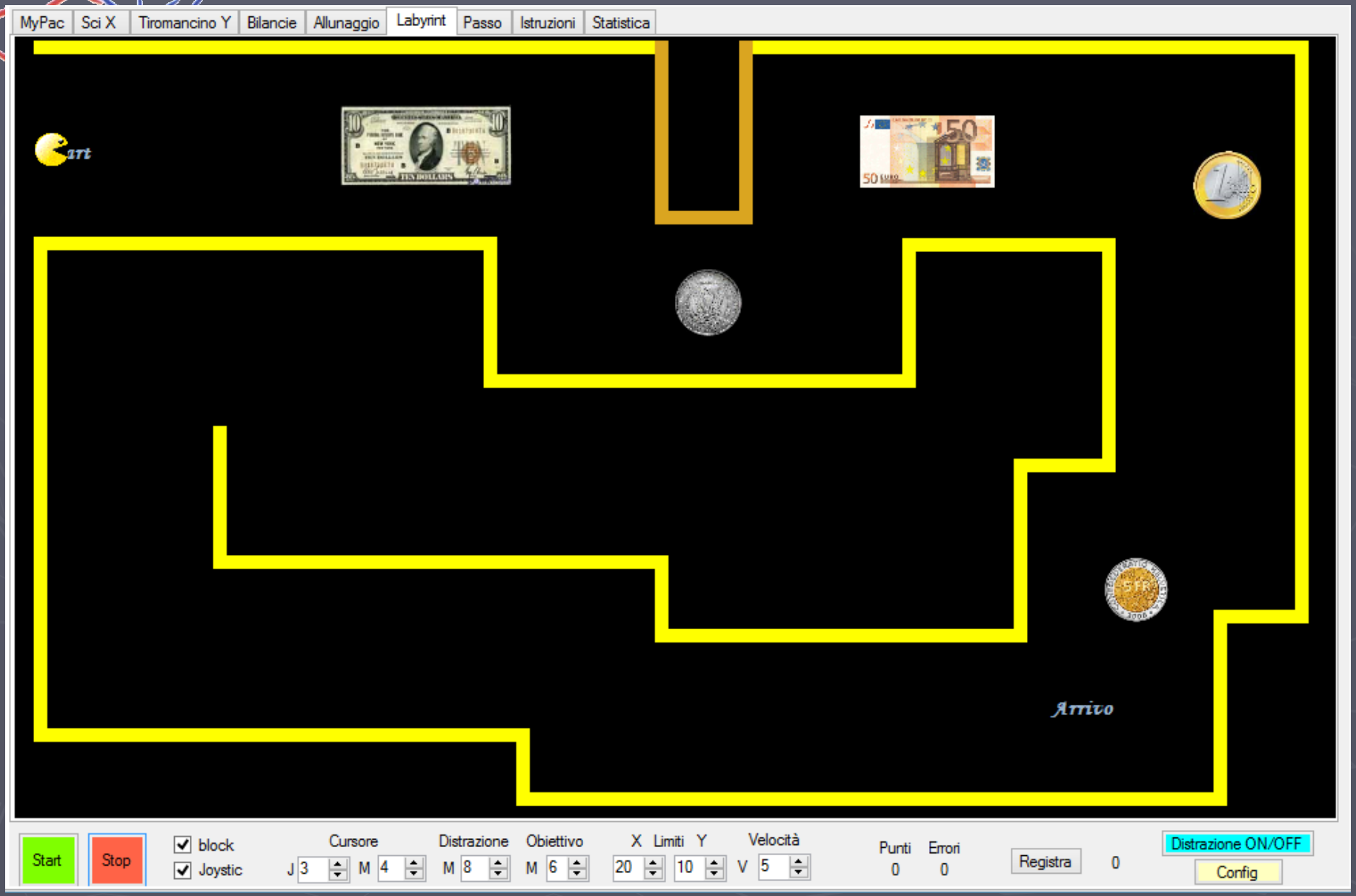
Intercettare obiettivi in movimento



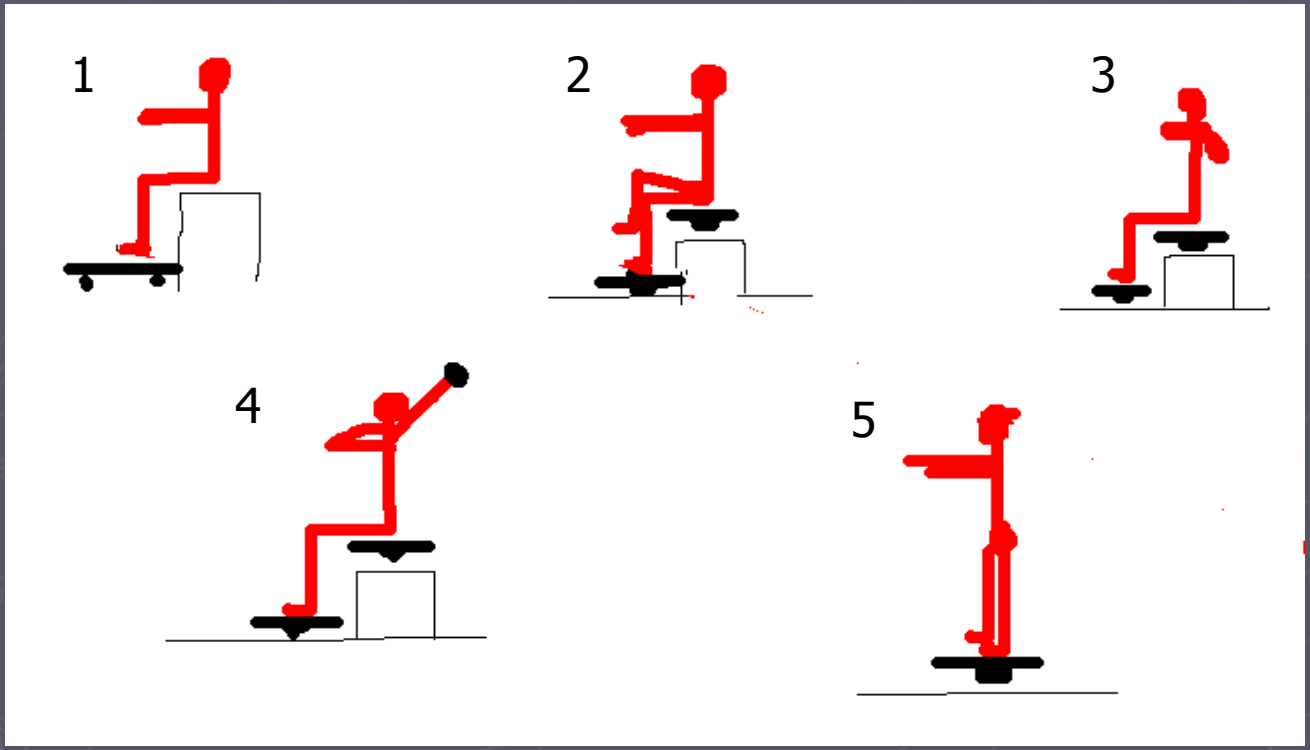
Mantenere il centro

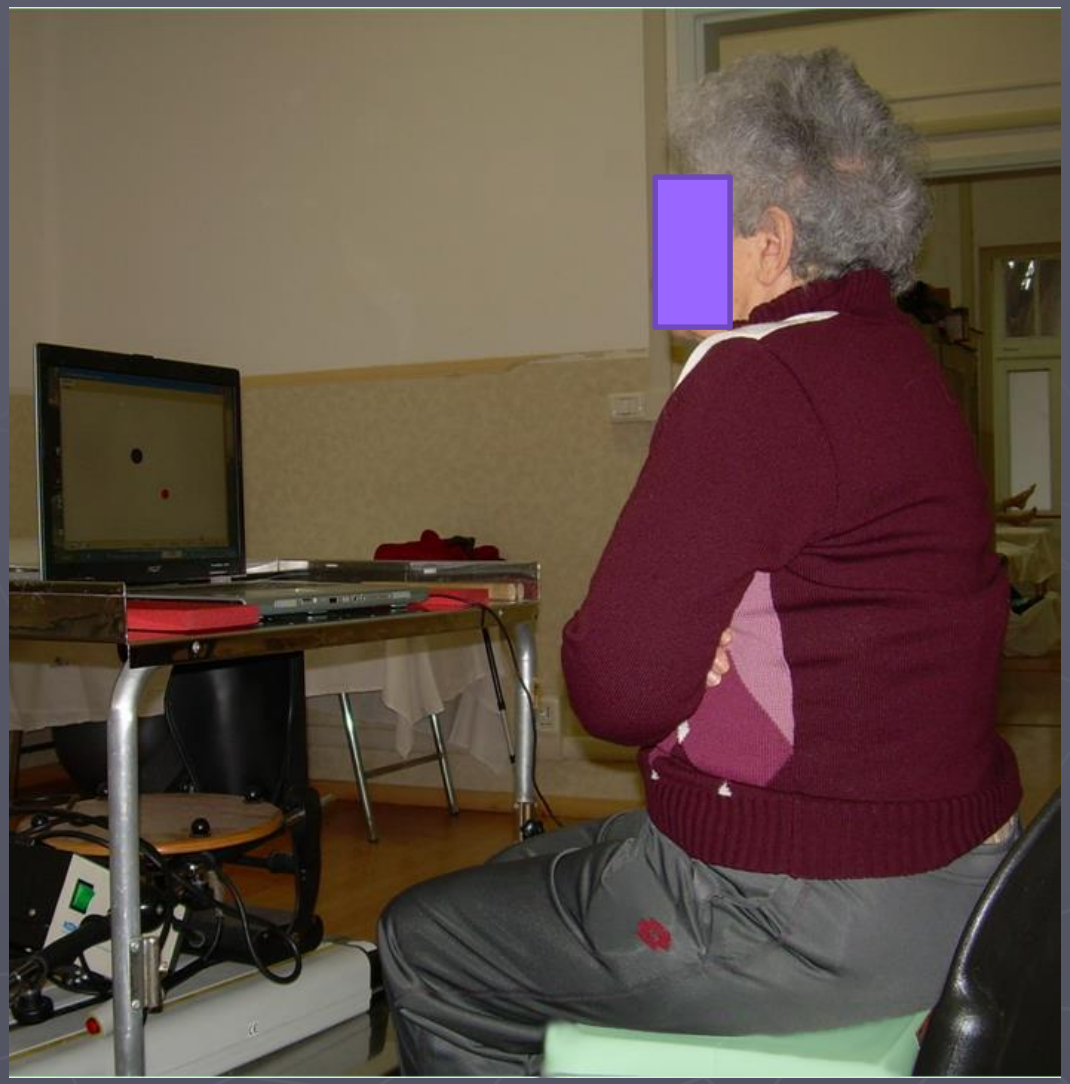


Seguire un percorso

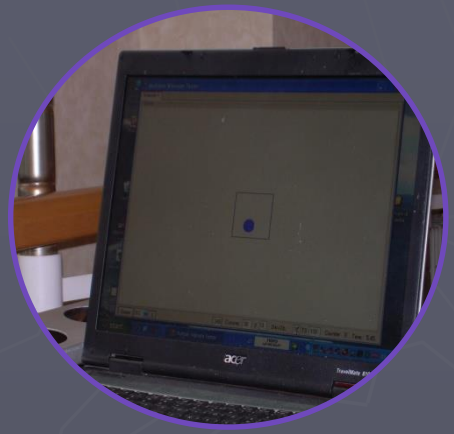


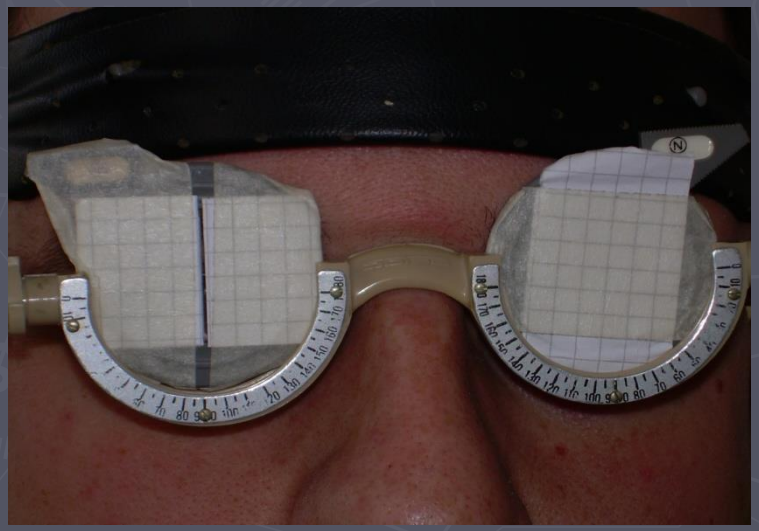
Programma Riabilitativo

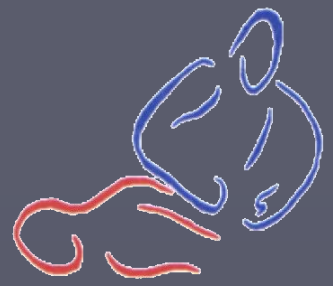




Occhiali per il restringimento del campo visivo



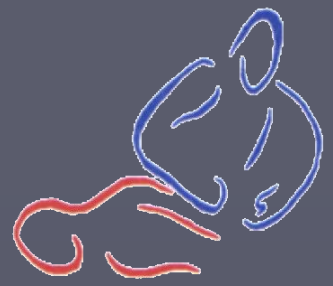




IL COLPO DI FRUSTA

- Segni muscolo – scheletrici
- Segni neurologici periferici
- Vertigini ed altri segni neurovegetativi
- Aspetti neuropsicologici

- La "*Sindrome da indennizzo*"



CLASSIFICAZIONE

Grado 0: Assenza di disturbi soggettivi ed obiettività clinica

Grado 1: Presenza di cervicalgia semplice, rigidità o iperestesia del collo

Grado 2: Cervicalgia e segni muscolo-scheletrici oggettivi (riduzione dell'articolarità e presenza di punti di dolorabilità / iperestesia)

Grado 3: Cervicalgia con segni obiettivi muscolo-scheletrici ed interessamento neurologico periferico (riflessi osteotendinei diminuiti o assenti, ipostenia muscolare, deficit sensitivi)

Grado 4: Cervicalgia con segni clinici di lesioni gravi (frattura e/o lussazione).

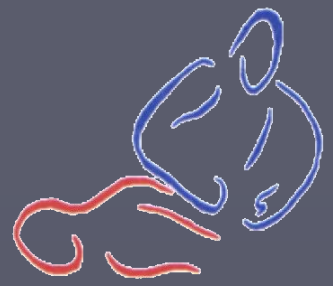
PROTOCOLLO

Valutazione clinica
Valutazione stabilometrica

prima e dopo
ciclo di trattamento

PROTOCOLLO RIABILITATIVO:

- Manualità
- TENS
- Esercizi con Accelerometro / Pedana



CASI CLINICI

- 8 pazienti
- Colpo di frusta di 2° - 3° grado
- Presi in carico tra il 14° ed il 60° giorno dal trauma
- Sottoposti a 10 sedute

RISULTATI

Variazioni medie in gradi del Range of Motion:

Flessione **+ 7,5**

Estensione **+ 6,87**

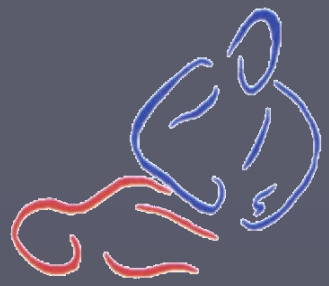
Inclinazione **+ 11,57** (per lato)

Rotazione **+ 21,88** (per lato)

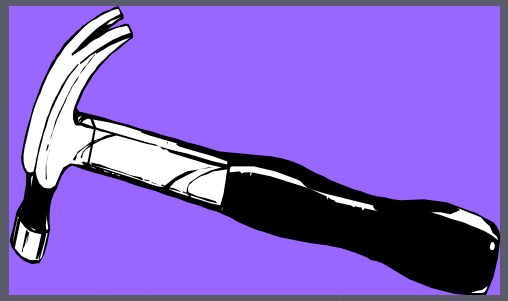
RISULTATI

SKG (T1→T2)	Area (Occhi Aperti)		Area (Occhi Chiusi)	
	T1	T2	T1	T2
Media	409,64	178,86	835,91	437,85
Dev.st.	296,23	100,04	481,49	423,31
Mediana	360,95	175,15	797,6	318,9

SKG (T1→T2)	Lunghezza (Occhi Aperti)		Lunghezza (Occhi Chiusi)	
	T1	T2	T1	T2
Media	460,67	268,56	725,65	405,2
Dev.st.	202,20	128,16	429,99	191,29
Mediana	501,4	243,8	601	302



Se l'unico strumento
che uno possiede è
il martello .....



..... tratterà ogni
problema come
se fosse un
chiodo !

Grazie