1. 現今科技發展對於神經物理治療有很大的衝擊。請以您的瞭解，說明以下兩種科技可能在神經物理治療中的應用，以及背後可能之學理依據
   a. 復健機器人(rehabilitaition robotics) (10%)
   b. 虛擬實境(virtual reality) (10%)
2. 請說明何謂雙側上肢訓練(bilateral arm training)(5%)?何謂鏡像訓練(mirror therapy)(5%)?並說明雙側上肢訓練法與鏡像訓練法運用於治療中風患者上肢功能復健上之異同(5%)
3. 請先閱讀下列文章

Clin Rehabil. 2006 Jan;20(1):36-45.

Effects of visual and auditory cues on gait initiation in people with Parkinson's disease.

Jiang Y, Norman KE.

Abstract

OBJECTIVE:
To evaluate the effects of auditory and visual cues on gait initiation in people with Parkinson's disease.

SUBJECTS:
Fourteen subjects with Parkinson's disease were recruited from community support groups, seven of whom reported having experienced freezing when walking.

DESIGN AND SETTING:
This study was a repeated measures analysis of gait initiation performance during a single visit to a university-based motion laboratory. Following baseline trials, auditory and visual cue conditions were presented in random order. The auditory cues were rhythmic sounds with an interval matching the subject's average step time. The visual cues were high-contrast transverse lines on the floor adjusted for the subject's first step length and overall height.

MAIN MEASURES:
Kinematic recordings enabled calculation of the timing and length of steps as well as overall velocity. The timing and magnitude of weight shift and push-off force were obtained from a force platform.

RESULTS:
The magnitudes of first and second step lengths, of push-off force and of overall gait velocity were significantly greater in the visual cue condition than in the baseline condition, whereas there was no significant effect of auditory cue on these measures. Neither cue had any significant effect on the timing of key events in gait initiation.

CONCLUSIONS:
Transverse line visual cues enable people with Parkinson's disease to begin walking with longer steps, greater push-off force and higher velocity. Auditory cues that others have shown to improve aspects of gait in people with Parkinson's disease do not appear to have any systematic effect on the first two steps of gait initiation.

請以這篇文章的摘要內容說明視覺提示(visual cue)及聽覺提示(auditory cue)在巴金森氏症上步態訓練治療應用之異同(10%)，並依您的瞭解說明這兩者之間的差異背後可能的神經機轉來源 (5%).

4. 請說明何謂「神經塑性」，並請用文獻與實例探討神經塑性在神經復健扮演的角色。(10%)

見背面

5. 請以圖文說明「stretch reflex」、「reciprocal inhibition」、「cross-extension reflex」、與「alpha-gamma co-activation」之神經機制，並討論它們在動作控制扮演的角色，以及這些機制異常時會出現的動作控制困難。(12%)
6. 一位中風病患的步態及步速以 Brunnstrom Evaluation form 評估結果如下。請問：您認為應再進行哪些檢查，以幫助判別造成這些步態異常與步行功能下降之損傷(impairments)是甚麼。為什麼選擇這些檢查? (12%)

GAIT ANAYSIS AND AMBULATION

	1	2	3	4
Parallel Bars				
Cane	V			
Supported				
Alone	V			

	1	2	3	4
Elbow Flexed	V			
Arms Hangs Flaccidly				
Swing Near Normal				

Affected Foot Leads	V			
Short Step with Normal Foot	V			
Even Steps				

Apparatus:

With Brace				
Without Brace	V			

Ankle Stance Phase:	1	2	3	4
Entire Sole Down				
Toes First	V			
Inversion, Early Stance				
Inversion, Throughout				
Valgus on Mid-stance				
Near Normal Heel-Toe				

Remarks:

Ankle Swing Phase:	1	2	3	4
Toes Drag	V			
Foot Inverts				
Exag. Dorsiflex.				
Near Normal				

Remarks:

Knee Stance Phase	1	2	3	4
Buckles				
Hyperextends	V			
Stable in Flexion				
Near Normal				

Remarks:

Knee Swing Phase	1	2	3	4
Stiff				
Moder. Stiff	V			
Exag. Flexion				
Near Normal				

Remarks:

Hip Stance Phase	1	2	3	4
Trendelenburg				
Trunk Forward	V			
Steady, Near Normal				

Remarks:

Hip Swing Phase	1	2	3	4
Circumduction	V			
Ext. Rotation	V			
Pelvic Hike				
Exag. Flexion				
Adduction				
Near Normal				

Remarks:

	1	2	3	4
Cadence (Step/min)	72			
Speed (m/min)	18			

THERAPIST & TESTING DATE:

Test 1

Test 2

Test 3

Test 4

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7. 下面三個表格(Tables I~III)皆摘自 Hellweg S, Johannes S. Physiotherapy after traumatic brain injury: a systematic review of the literature. Brain Inj 2008;22:365-373。請根據三個表格提供的資訊提出創傷性腦部外傷患者之物理治療原則與建議(16%)。

Table I. Level of evidence.

Level of evidence	
1++	High quality meta analysis, systematic review of RCTs or RCTs with a very low risk bias for systematic errors.
1+	Well conducted meta analysis, systematic review of RCTs or RCTs with a very low risk bias for systematic errors.
1−	Meta analysis, systematic review of RCTs or RCTs with a high risk bias for systematic errors.
2++	High quality systematic reviews of case-control or cohort studies. High quality systematic reviews of case-control or cohort studies with a low risk of systematic errors, e.g. confounding with a high probability that the relationship is causal.
2+	Well conducted case control or cohort studies with a low risk of systematic errors, e.g. confounding with a high probability that the relationship is causal.
2−	Case control or cohort studies with a high risk of systematic errors, e.g. confounding with a high probability that the relationship is causal.
3	Non-analytical studies, e.g. case report, case series.
4	Expert opinions.

Table II. Grade of recommendation.

Grade of recommendation	
A	At least one meta analysis, systematic review, or RCT rated as 1++ and directly applicable to the target population and yielding overall consistency of results.
B	A body of evidence including studies rated as 2++ and directly applicable to the target population and yielding overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
C	A body of evidence including studies rated as 2+ and directly applicable to the target population and yielding overall consistency of results; or extrapolated evidence from studies rated as 2++.
D	Evidence level 3 or 4; or extrapolated evidence from studies rated as 2+.

Table III. Studies involved

Study	Therapy/intervention	Patients or studies	Design	E	TBI	Conclusions
Sensory stimulation						
[5]	sensory stimulation	Not identifiable	SR	2++		Recommendation grade A: no verifiable evidence of the efficacy of sensory stimulations programmes
[4]	sensory stimulation programme vs standard rehabilitation	*n*= 68, 3 studies	SR	1++		
Treatment intensity						
[6]	Multidisciplinary rehabilitation vs routine programmes, Comparison of different treatment settings and intensities	*n*= 2564,14 studies	SR	1++		Recommendation grade A: more intensive rehabilitation programmes lead to early functional skills
[8]	Comparison of conventional rehabilitation vs intensified treatment (additional 1 hour PT/ET per day)	*n*= 36	RCT	1++		TBI
[7]	Comparison experimental group: on average 67% more	*n*= 141	RCT	1−		

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	therapy than the control group					
[9]	Standard therapy vs additional therapy as requested by the rehab team	*n*= 51	RCT	1+		
[5]	Treatment intensity	Not identifiable	SR	2++		
Orthosis, serial casts						
[5]	Orthosis, cast treatment	Not identifiable	SR	2++		Recommendation grade B: Improvement in PROM after serial casts or orthosis, Recommendation grade C: Reduced spasticity after serial casts or orthosis
[10]	Cast treatment of ankle, elbow and knee joints, combined in 4 studies with stretching or conventional physiotherapy	13 studies	SR	2++		
[12]	1 week cast treatment with stretching vs 1 week without cast treatment and without stretching	*n*= 9	CT	1−		TBI
[13]	1st group: standard PT, 2nd group: cast treatment with injection of salt solution, 3rd group: cast treatment combined with botulinum toxin	*n*= 35	RCT	1−		
[11]	Routine therapy: 5×/week. 30 min individual motor training programme for the upper extremities, 2 × 30min stretching of the upper extremities 5×/week for 5 weeks;Intensive group: additional hand splint worn for 12 hours a day for 4 weeks	*n*= 28	RCT	1++		Recommendation grade A: no verifiable clinical improvement after night splints in functional position
Strength training						
[5]	Strength and fitness training		SR	2++		Recommendation grade A: Improvement in cardiovascular fitness after strength training
[15]	Intervention group: 3×30 min/week. Individual strength training on the ergometer bicycle for 12 weeks; Control group: individual relaxation: breathing exercises, progressive relaxation, autogenous training, visualization	*n*= 38	RCT	1+		
Functional training						
[16]	Intensive group: For 4 weeks intensive sit-stand and step-up training 5 days a week; Control group: no additional training	*n*= 24	RCT	1+	TBI	Recommendation grade A: for the efficacy of intensive task-oriented training programmes
[17]	Intensive group: Gait training with partial weight	*n*= 38	RCT	1+	TBI	Recommendation grade A: Gait

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	bearing 2×/week for 8 weeks; Control group: standard PT, whereby treatment time was identical for both groups					training with partial weight bearing is not superior to physiotherapeutic gait training
[18]	3 groups: (1) no AAT (functional arm training), (2) AAT, (3) AAT+ knowledge of results	*n*= 60	RCT	1+		Recommendation grade A: proof of efficacy for AAT

試題隨卷繳回