BELGIAN ERGONOMICS SOCIETY

STUDIEDAG BES
nederlandstalige vleugel

Thema : 20 jaar BES en 50 jaar IEA

Maastricht congres

“Meeting diversity in Ergonomics”

International Ergonomics Association

IEA congresses

Tiennial congresses since 1961

Recent congresses:

1994: Toronto, CDN, 1.500 participants

1997: Tampere, SF, 1.700 participants

2000: San Diego, USA, 2.700 participants

2003: Seoul, Korea, 1.200 participants

2006: Maastricht, target: >1.500

IEA congress' structure

- **5 days event**
- **Most sessions in English**
- **Many participants present papers**
- **Daily 4 keynotes by invited speakers**
- **Knowledge distribution, and interaction**
- **Proceedings ready at the congress**
- **Informal, interaction promoting atmosphere**

Bijdragen BES Nl leden :

Veerle Hermans *"Relatie Ergonomie en OSH en het effect van interventies"*

Huget Desiron *"Rugscholing en Revalidatie"*

Mark Hautekiet "*Van tiltechnieken naar ergonomiebeleid in de verzorgingssector"*

PAUZE

voorstelling van een aantal posters

Roeland Motmans *“Analyse van 3 types schoolmeubilair volgens prEN 1729”*

Christoph Maes *“De invloed van de hoogte van het beeldscherm op de aktiviteit van nek- en schouderspieren”*

Willy Bohets *“Analyse van auditresultaten van DuPont vestigingen ifv ergonomie”*

Jan Seghers *“Overzicht en impressies van het IEA congres”*

RECEPTIE

idewe
Externe Dienst voor Preventie en Bescherming op het Werk vzw

Vrije Universiteit Brussel

BELGIAN ERGONOMICS SOCIETY

Applied Ergonomics & OSH

A mother-daughter or sister-sister relationship?

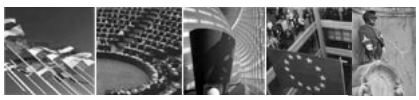
Veerle Hermans

Amazing Antwerp

Beautiful Bruges

Gorgeous Gent

Live in Leuven



Browsing Brussel

Lovely Liège

idewe
Externe Dienst voor Preventie en Bescherming op het Werk vzw

Contents

- Relevance: position
- Legislation
- The business case
- Conclusion

Relevance

- Position of ergonomics?
- Success of ergonomics?
- Position of ergonomists versus other?

Position of ergonomists

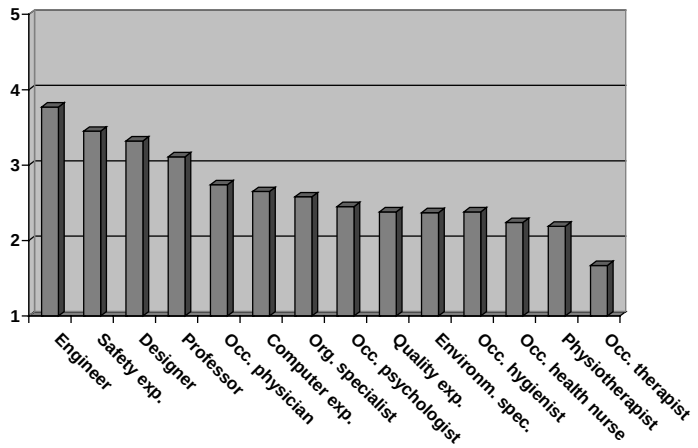
Typical certified ergonomist:

- Male
- Full-time employed external consultant
- 45 years old
- Master degree
- + 10 years of experience

Breedveld & Dul, 2005

idewe

Position of ergonomists



Breedveld & Dul, 2005

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Position of ergonomics

Organizations first design the technical system and then consider ergonomics	3.7
People think that ergonomics is to design chairs	3.1
People think that ergonomics is only common sense	3.1
Laboratory and field experiments take too long and are too costly	3.1
The research in ergonomics is too abstract for employees to be useful	2.7
People are adaptive, so there is no need for ergonomics in design of systems	2.6
The theoretical information in handbooks cannot be used for design	2.6

0-5 scale: never - always

Breedveld & Dul, 2005

idewe

Legislation ?

- C155 OSH (ILO, 1981)

principles of a coherent national policy on occupational safety, occupational health and the working environment in general were described, including its implementation and its periodical review

➔"design, testing … maintenance of the material elements in the workplace"

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Legislation ?

Ergonomics ?

- OSH R164 (ILO, 1981)

measures should be taken in pursuance of the policy referenced in the convention, in particular in the following fields:

- Design, setting, structural features, installation, maintenance, …lighting, ventilation, …;
- Temperature, humidity and air movement in the workplace;
- Prevention of harmful physical or mental stress due to the conditions of work;
- Prevention and control of, and protection against, occupational hazards due to noise and vibration.

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Legislation ?

- CD 89/391 (EU, 1989): individual directives - minimum requirements

e.g. working with visual display units:

- "The work chair shall be stable and allow the operator easy freedom of movement and a comfortable position.
- The seat shall be adjustable in height.
- The seat back shall be adjustable in both height and tilt"

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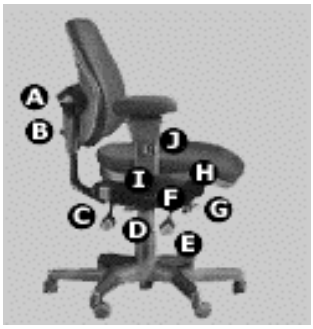
Legislation



TC EQUID!

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The business case

- EU directive 89/391/EC:

  "prevention of risk at work needs to adopt a multidisciplinary character"

  ➔ Primary prevention

  ➔ Accident prevention -> wellbeing at work

  ➔ Corrective -> proactive

  ➔ Teamwork:

Safety engineer
Occupational doctor
Industrial hygienist
Work psychologist
Ergonomist

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The business case

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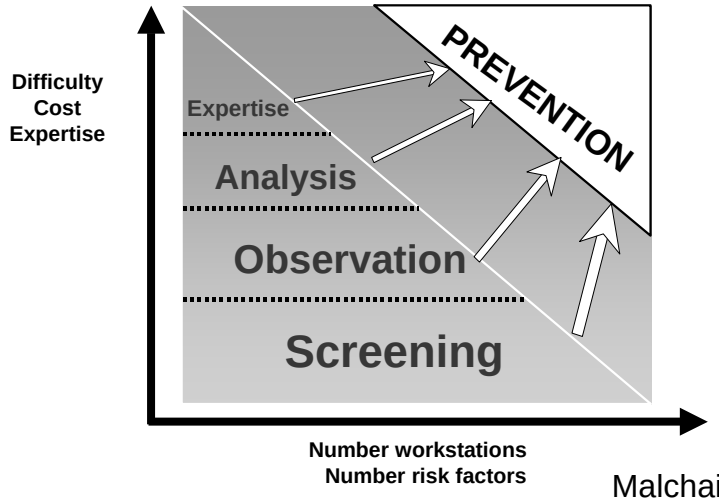
Occupational doctor
Industrial hygienist
Work psychologist
Ergonomist

Reality ?
e.g. SME's ?
(Kogi, 2006; Caple, 2006

The business case



Malchaire, 2004

5. Bedieningsapparatuur en signalen

Te bespreken:	**Wat kan <u>concreet</u> worden gedaan om de situatie te verbeteren ?**
• De documenten waarop het uit te voeren werk wordt omschreven (borden, lijsten…) zijn duidelijk • De visuele signalen (schermen, lampen,…) en de bedieningsapparatuur (drukknopen, hendels, pedalen, ...) : ▪ bevinden zich dicht bij en tegenover de werknemer wanneer ze frequent worden gebruikt ▪ bevinden zich niet te hoog, noch te laag • Ze zijn comfortabel voor wat betreft: ▪ het respecteren van de stereotypes: mobiele wijzer van links naar rechts, groen = aanzetten… rood = uitzetten, richting van , … ▪ het geluidsniveau, de lichtintensiteit ▪ de vormen, de afmetingen (drukknopen, controlelampen, …) ▪ de uitrusting: plaatsing van de bedieningspanelen, aantal en kleur van de knoppen, lampen… ▪ de houding van het lichaam, het hoofd, de arm of het been om de bedieningsmiddelen te activeren of de signalen te zien ▪ de uit te oefenen drukkracht met de vinger of de voet, …	

Meer in detail te bestuderen aspecten:

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1.	Werkzones	☺	😐	☹
2.	Technische organisatie tussen de werkposten	☺	😐	☹
3.	Locatie van het werk	☺	😐	☹
4.	Risico's op ongevallen	☺	😐	☹
5.	Bedieningsapparatuur en signalen	☺	😐	☹
6.	Gereedschap en materiaal	☺	😐	☹
7.	Repetitief werk	☺	😐	☹
8.	Manuele goederenbehandeling	☺	😐	☹
9.	Mentale belasting	☺	😐	☹
10.	Verlichting	☺	😐	☹
11.	Lawaai	☺	😐	☹
12.	Thermische omgevingsfactoren	☺	😐	☹
13.	Chemische en biologische risico's	☺	😐	☹
14.	Trillingen	☺	😐	☹
15.	Arbeidsverhoudingen tussen werknemers	☺	😐	☹
16.	Algemene en lokale sociale omgeving	☺	😐	☹
17.	Inhoud van het werk	☺	😐	☹
18.	Psychosociale omgeving	☺	😐	☹

www.sobane.be

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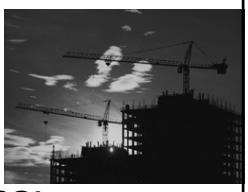
The business case

Narrow view



Ultimate goal of ergonomics:

"scientific discipline … understanding interactions humans - systems … profession … applies theory … to design…optimize human wellbeing and overall system performance"

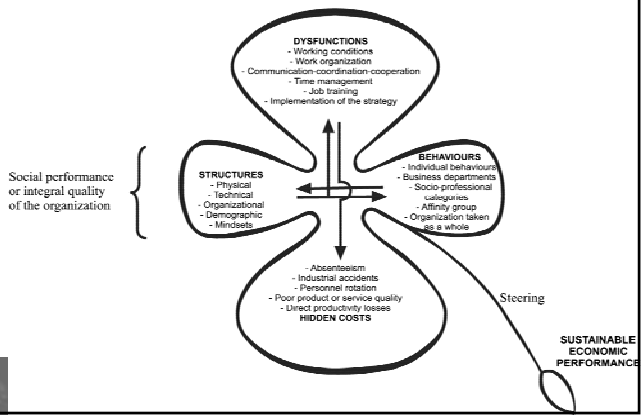
IEA, 2000

idewe

The business case

"the traditional ergonomic approach of designing tools and methods or the so-called micro-ergonomics, is insufficient to achieve a considerable impact on productivity, quality, health and safety and the quality of work life"

(Hendrick 1996)



(Savall, 2003)

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Conclusions / TO DO's

- In literature: discrepancies regarding effectiveness of ergonomic interventions
  - Methodological quality (Karsh et al. 2001, Neumann et al. 2001, Volinn 1999)
  - Negative publication…

➔ Project design recommendations (Koningsveld et al. 2005)

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Project design recommendations

- carry out a good inventory;
- arrange direct workers' participation;
- arrange strong management support;
- use a step-by-step approach;
- do not only focus on health issues;
- arrange that a steering group is established with responsibilities;
- check the effects, including side effects in an early stage;
- describe the **costs: benefit ratio**, not only in money but also with non-quantitative measures.

+ Vink, 2006

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Conclusions / TO DO's

- Economic incentive (Oxenburgh, 2004; Dul, 2003)
- Business language: mutual interest

Conclusions / TO DO's

- Economic incentive (Oxenburgh, 2004; Dul, 2003)
- Business language: mutual interest

- Core business purposes

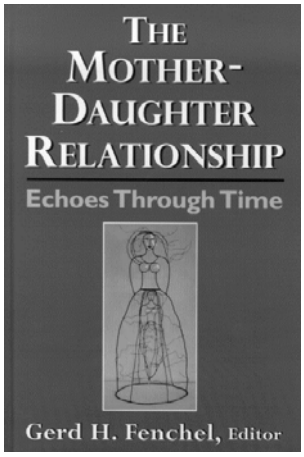
CSR initiatives	3P: people/planet/profit
Interdisciplinary focus	Empowered organisation
Continuous communication	Valuable workers
Meeting diversity	"Warm interest" (Vink, 2006)

"having fun" (Goetzel, 2001)

Reality ?
e.g. SME's ?

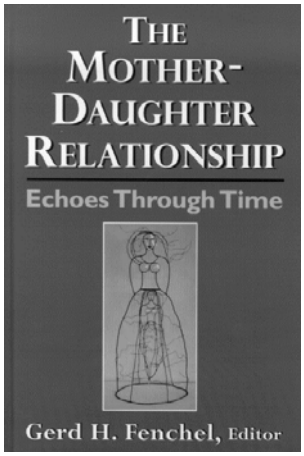
Mother - daughter relationship?

Mother - daughter relationship?



Past literature shows that the mother-daughter relationship is considered the most significant of all intergenerational relationships

Mother - daughter relationship?

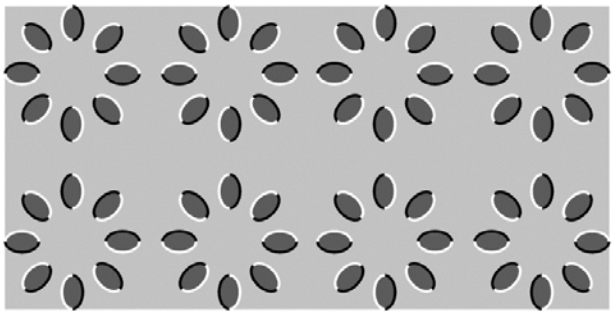


Past literature shows that the mother-daughter relationship is considered the most significant of all intergenerational relationships

My own experience shows that daughters can fight…

With special thanks to:

Ford Genk, Dr. Cardinaels
Jan van Peteghem
Prof. J. Malchaire
The conference organisation



Ergonomics as the leading thread in a recovery program for persons suffering from back aches

H.A.M. Désiron
EUR-Ergonome,
Occupational Therapist,
Master Occupational Health

Introduction

- ✓ Chronic back aches : multidisciplinary approach (DBC)
- ✓ Integrating ergonomics in a multi-disciplinary approach
- ✓ Ergonomics
  - determine the theoretical framework.
  - During direct contacts with patients, the latter gain an understanding of ergonomic principles allowing them to align their actions and environment to their specific strainability.
  - The presented approach has been used since 2003 by the Limburgse Rugkliniek to treat persons suffering from back aches.
- ✓ Long anamnesis on back pain.
- ✓ Fits the Belgian health-care sector's increased attention for persons with back aches.

ACT desiron bvba

Concept

- ✓ Ergonomic approach,
  - Treatment
  - Accompaniment of patients.
    - exploring one's own moving body
- ✓ Key element in the basic philosophy
  - Human being as an information processing action-oriented system
  - Attention to the right way of moving:
    - based on a holistic approach in which patients are taught to use the full "human being-system"

desiron bvba

Approach

- ✓ Exercises are directed at specific deficits of the ailing musculo-skeletal system.
- ✓ Reductions in pain and disability are achieved as improvements are gained in function, control and cognitive-behavioural dimension.
- ✓ Usually the programme lasts 6 or 12 weeks with two treatment sessions a week.
- ✓ Impact of the approach
  - different experts
  - Stakeholders

desiron bvba

The patient as team member

- ✓ Considers the patient and his perception of the therapy as vital.
  - build his understanding of how to move and act in the right manner.
- ✓ Intake
  - understand the patient's expectations.
  - understand how the patient defines "moving" and "acting".
- ✓ Continued focus on the interaction between patient's views, needs and expectations and the answers
- ✓ Patients are and remain responsible for their own behaviour.
  - Motivation for efforts
  - Cope with their medical and functional reality

ACT desiron bvba

The link with ergonomics

- ✓ The Limburgse Rugkliniek's vision can be summarised as: "**it is essential to move**".
- ✓ Take in account
  - Pathological necessities
  - Repairing and/or regaining **quality of life**
  - Patients: **stimulated to move** in a way they can achieve
  - Patients gain theoretical and practical **understanding** of the **impact** of **static** and **dynamic strain** and how this can influence their particular situation.

ACT desiron bvba

The link with ergonomics

- ✓ Different disciplines: insight
  - Analysis how patient fits in his environment.
  - Patients discover that they can influence their situation.
  - Interview: subjective perception of strain at work.
  - Objectivation : measurement
  - Detection of bottle-necks
    - precise intervention
    - Communication with employer

desiron bvba

Ergonomic vision

- ✓ Incorporating ergonomics in a program to treat chronic back patients calls on all aspects of ergonomic science.
  - physical ergonomics (joined by occupational therapy and physiotherapy),
  - cognitive ergonomics (together with occupational therapy and psychology)
  - organisational ergonomics (together with psychology, patient and stakeholders).
- ✓ Attention must first be given to adapting the environment to the person. If this is not possible, it is vital to direct activities to what is feasible, bearing in mind the patient's strainability profile.

desiron bvba

Ergonomics as an integrated part of the approach

- ✓ Purpose : start moving again
- ✓ Functioning of “mind-brain-body” system
- ✓ Ergonomics sessions
  - task to reflect upon.
- ✓ Attention for patient’s actions during the pre- and post treatment phases is reflected in the actions by the different team members together with the patient.
- ✓ Visit and analysis of the work place

desiron bvba

Ergonomics as an integrated part of the approach

- ✓ The ergonomist as a member of the team
- ✓ Insight-based work
- ✓ Application during functional training
  - Stress on “ability”.
  - focuses on difficult or avoided activities (fear of pain)
  - “repeat effect”: from “knowing” over “understanding” to “applying”.
- ✓ The ergonomic and functional training
  - didactic kitchen
  - washbasin
  - office workstation
  - bed.

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Return to work

- ✓4 steps
  - – interview with the patient
    - professional history
    - information about work environment
  - – meeting of the ergonomist, the patient and his supervisor
  - – visit to the jobsite
  - – report listing the problem areas and the possible solutions

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Return to work

- ✓Participative approach
  - – patient's input as a team-member
  - – The other major participants
    - occupational physician
    - prevention advisor
    - direct super-visor
- ✓Work place analysis
  - – Organisation
  - – duration
  - – tasks involved
  - – work relations.
  - – If available, the work environment parameters (noise level, lighting, etc.)

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Critical observations

- ✓ literature:
  - evidence supporting a multidisciplinary approach
  - less evidence as to which contribution each of the above mentioned disciplines has to make in order to achieve maximum efficiency.
  - Both literature and legislation consider ergonomics to be important, but the methods, the actual approach and the results of this input are much less documented
- ✓ Ergonomic interventions : “rehabilitation ergonomics”
  - link with (occupational) therapy.
  - Ergonomics: preventive approach
  - occupational therapy curative approach

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Conclusions

- ✓ Belgium: ergonomics embedded in the care for persons with chronic back pain.
- ✓ Real life cases : ergonomic insights enables patients to manage the balance between the strain and their own strainability.
- ✓ Work place analysis
  - is not possible (or allowed) in every work environment
  - participative approach results in proposals to improve the situation.
  - not all of these proposals will be immediately and fully implemented,
  - the impact of the analysis contributes to awareness of the balance between the strain and the strainability
  - safeguard employment in the long run.

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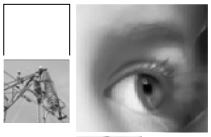
Conclusions

- ✓ Ergonomics can contribute
  - rehabilitation ergonomics
  - occupational health
- ✓ Evidence based practice must further develop
  - extension of research into the extent to which ergonomics provides tangible added value in the approach of the treatment and the reintegration of people suffering from chronic back aches.

desiron bvba

Thank You



Een klare kijk op uw preventiebeleid

Van tiltechnieken naar ergonomiebeleid in de verzorgingssector

Mark Hautekiet, Eur.Erg.
Preventieadviseur Ergonomie
Celhoofd Ergonomie

IKMO

Enkele vaststellingen

- Blijvende vraag voor opleiding tiltechnieken
- Opleidingen mogen niet te veel tijd in beslag nemen (frequentie en duur)
- Moeten in praktijk plaats ruimen voor andere urgenties
- Worden georganiseerd vanuit het verpleegkundig departement
- De effecten blijven beperkt…

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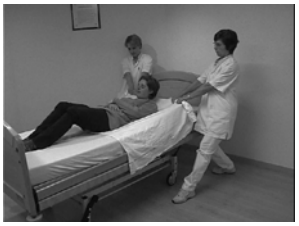
Tiltechnieken ?

- Tiltechnieken zijn verkeerd uitgangspunt
- Beter verplaatsingstechnieken of hoe kunnen patiënten verplaatst worden met minimum aan kracht (en dus minimum aan belasting en maximum aan comfort voor de patiënt)



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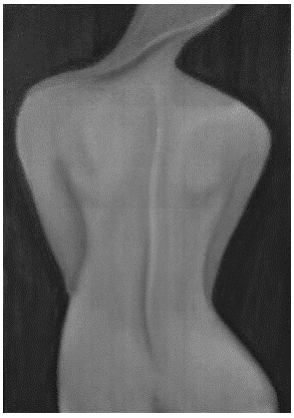
Opleidingsduur ?

- Opleidingsmomenten moeten voldoende doorwegen om zichtbaar te zijn in de organisatie
- Dit kan door herhalingen, ondersteuning met posters, folders of nieuwe media, info via intranet, zichtbaar maken van hulpmiddelen, agendapunt op teamvergadering, referentiepersonen

IKMO

Andere urgenties ?

- Rug- en nekklachten zijn belangrijke oorzaken voor werkverzuim en het opgeven van een job in de verzorgingssector
- Acties die hier iets willen aan doen dienen prioriteit te krijgen

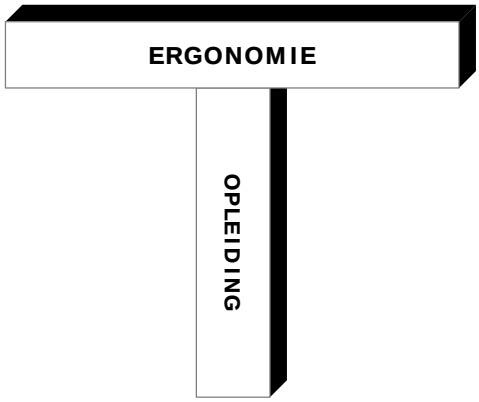


Organisatie ?

- Verpleegkundig departement mag ondersteuning geven in de organisatie
- Initiatief dient echter te komen vanuit de preventiedienst die deze opleidingen moet kaderen in het geheel van de preventiemaatregelen
  - Risicoanalyse
  - Globaal preventieplan
  - Jaaractieplan

Beperkte effecten ?

- Indien enkel de kaart van opleidingen getrokken wordt, komt men er niet
- Ergonomie heeft nog twee belangrijke pijlers



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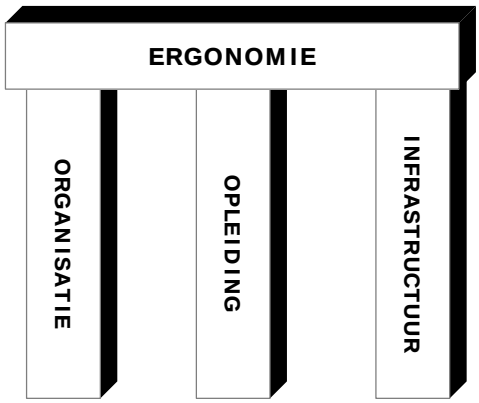
Beperkte effecten ?

- Deze dienen tegelijkertijd aan bod te komen zodat de aangeleerde verplaatsingstechniek en kunnen (infrastructuur) en mogen (organisatie) uitgevoerd worden op een juiste wijze



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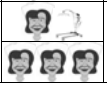
Beperkte effecten ?

- Verplaatsingsprotocol of afspraken over wat manueel nog verplaatst mag worden en wat niet (duidelijke grenzen aangeven)

		25 - 50 kg	50 - 75 kg	75 - 100 kg	> 100 kg
Meewerkende patiënt	Transfers op bed				
	Transfers inluit bed				
Passieve patiënt	Transfers op bed				
	Transfers inluit bed				

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Beperkte effecten ?

- Laat de infrastructuur toe om op een goede manier te werken, wat dient aangepast of verbeterd te worden?

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Daarom: ergonomiebeleid

- Directies moeten geïnformeerd en overtuigd worden
- De hiërarchische lijn moet geïnformeerd worden over ergonomie

Daarom: ergonomiebeleid

- De preventiedienst moet het beleid uittekenen (al dan niet samen met een werkgroep ergonomie)
- Er dient aandacht besteed te worden aan alle werknemers (niet alleen verzorgenden)

Daarom: ergonomiebeleid

- Elke beslissing (aankoop, verbouwing, nieuwbouw, organisatie) dient getoetst te worden op ergonomie
- Systematisch advies op gebied van ergonomie is aangewezen

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Besluit

- Indien men echt rug- en nekklachten wil vermijden en men een kwalitatieve dienstverlening wil bewaren
- Indien men het personeel in de verzorgingssector volledige carrières wil laten werken
- Dan is een degelijk ergonomiebeleid het enige antwoord

IKMO

Meer info ?

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- 8200 Brugge
- Tel. 050 47 47 35
- mark.hautekiet@ikmo.be
- www.ikmo.be

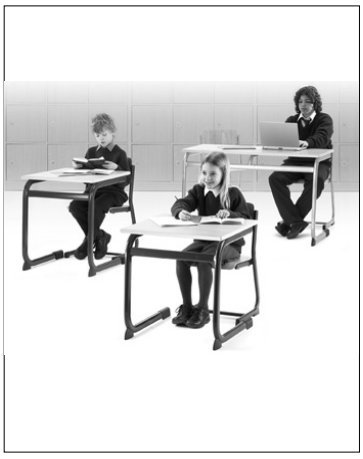
Evaluatie van drie types schoolmeubilair volgens prEN 1729

Roeland Motmans

“20 jaar BES, 50 jaar IEA: diversiteit in ergonomie”
Leuven, 2006

Inleiding

- Langdurig zitten
- Verschillende taken
- Verschillende lengtes

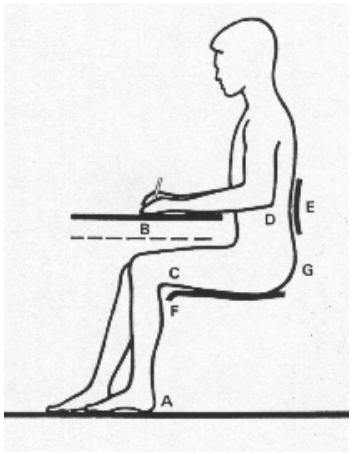


Mismatch meubilair

- één maat voor iedereen
- lager onderwijs
  - te hoog en te diep
- oudere leerlingen
  - afmetingen passen het best voor de kleinsten

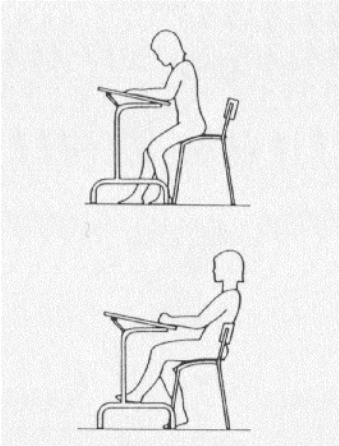
Rechtop zitten

- ISO 5970
- 7 groottes voor 90-190cm
- referentiehouding
  - voeten plat op de grond
  - zitting op knieholtehoogte
  - tafel op ellebooghoogte
  - steun in de lage rug



Open heuphoek concept

- hogere tafel en stoel
- voorwaarts gekantelde zit
- hellend tafelblad van 0-20°
- functioneel zitten

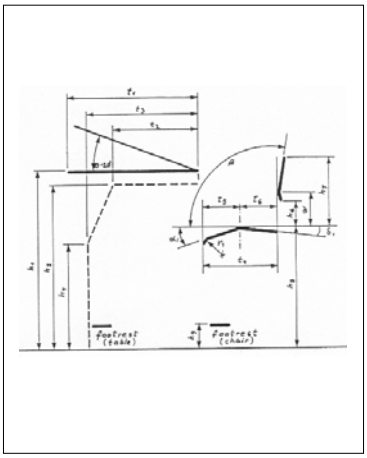


Onderzoek klassituatie

- subjectieve voorkeur voor open heuphoek meubilair
- voorkeur hellend tafelblad
- correcte steun in de lage rug is belangrijk

Normvoorstel prEN 1729

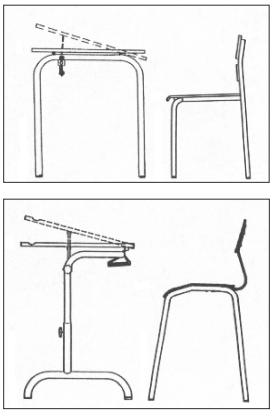
- 8 groottes
- indeling obv knieholtehoogte
- alle zitconcepten zijn toegelaten



Hypothese

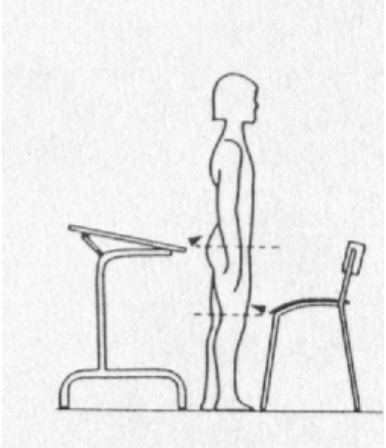
- bestaande meubilair
- rechtop zitten concept
  - achterwaartse taken
  - middenste zitpositie
- open heuphoek concept
  - voorwaartse lestaken

=> zithouding



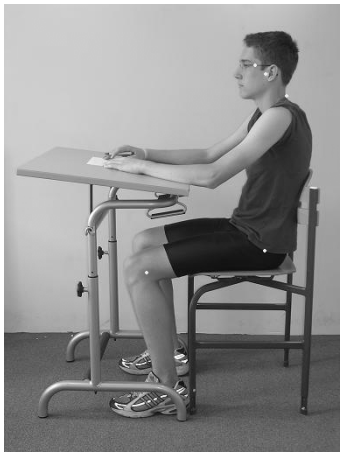
Methodologie

- deelnemers: 16 tot 18 jaar
- meubilair: bestaand
  rechtop zitten
  open heuphoek
- taken: schrijven
  overschrijven bord
  overschrijven kijken
  kijken



Methodologie

- hoofd tilt
- nekflexie
- romphoek
- heuphoek



Resultaten bestaand

- schrijven
  - flexie hoofd, nek en rug ↑
  - heuphoek = rechtop zitten
- overschrijven en kijken
  - heuphoek ↓
  - nek, romp = open heuphoek

Resultaten rechtop zitten

- kijken scherm
  - rug meer achterwaarts ↑
  - nekflexie ↓
- overschrijven en schrijven
  - heuphoek ↓
  - hoofd, nek en romp =

  (vergeleken met open heuphoek meubilair)

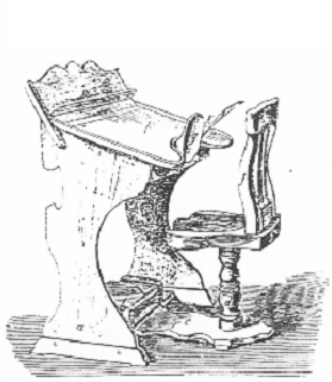
Resultaten open heuphoek

- schrijven en combinatie
  - heuphoek ↑
- kijken scherm
  - heuphoek =

  (vergeleken met rechtop zitten)

Hellend tafelblad

- buiging hoofd en romp ↓
- EMG nekstrekkers ↓
- subjectieve voorkeur
- onafhankelijk tafelhoogte

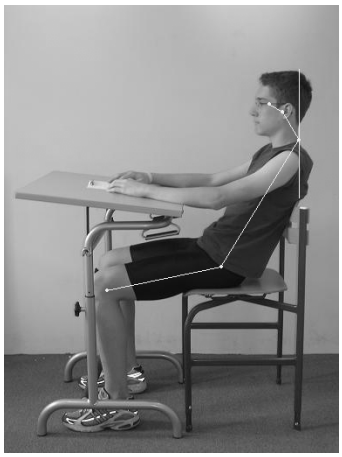


Rugleuning

- intradiscale druk ↓
- ontlastend voor de rug
- meer studenten gebruiken rugleuning bij rechtop zitten
- onderuit zakken

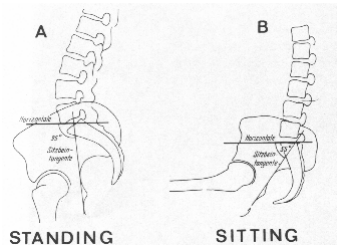
Relatieve nekflexie

- minder nekflexie tijdens kijken op scherm of niet ?
- absolute hoek of relatief tov rusthouding…



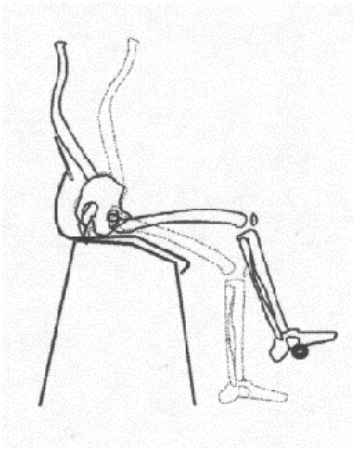
Open heuphoek

- retroversie bekken ↓
- lumbale lordose ↑
- ~ zithoogte
- tijdens voorwaartse taken
- subjectieve voorkeur



Conclusie

- actief: open heuphoek
- passief: rugleuning
- 57% tijd voorwaarts zitten
- open heuphoek passief =



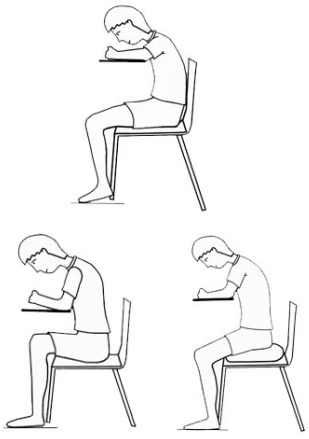
Effect van aangepast schoolmeubilair en een met lucht gevulde zitwig

Roeland Motmans

"20 jaar BES, 50 jaar IEA: diversiteit in ergonomie"
Leuven, 2006

Methodologie

- deelnemers: 10 tot 12 jaar
- meubilair: bestaand
  aangepast
  aangepast + wig
- taken: schrijven
  overschrijven
  kijken



Resultaten schrijven

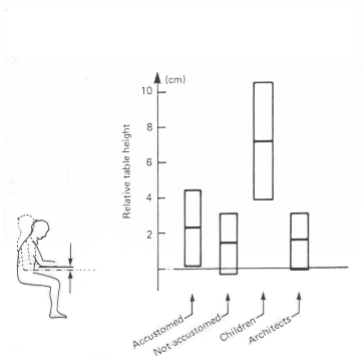
hoofd en romp ↓ rug ↑ heuphoek ↑

Resultaten TV kijken

rug ↓, armen ↑ afhangen benen ↓ rug ↑

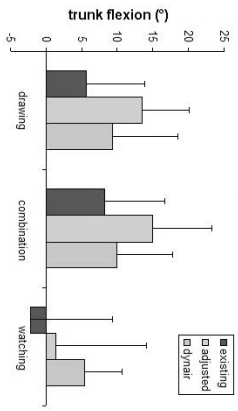
Hoge tafel

- goede rugpositie
- leesafstand
- subjectieve voorkeur
- armen sterk geheven
- EMG m.Trapezius =
- hellend werkblad ?



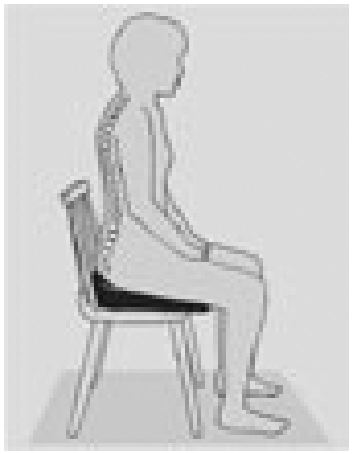
Horizontaal zitten

- meest gebruikt criterium
- heuphoek ↓
- afvlakking lage rug
- rugleuning niet effectief



Met lucht gevulde zitwig

- open heuphoek
- betere rugpositie
- dynamisch zitten (?)
- - : voorwaarts TV kijken



Conclusie

- verschillende groottes
- open heuphoek
- hellend werkvlak
- “actieve school”

Einde…

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- http://www.ergonomiesite.be

- Roeland Motmans
  Docent Ergonomie
  Associatie KULeuven
  België

The influence of the screen height on the activity of neck and shoulder muscles, tested on the iMac (Apple).

C. Maes, A. Ferdinande, S.Poriau, P. Roosen, W. Peersman

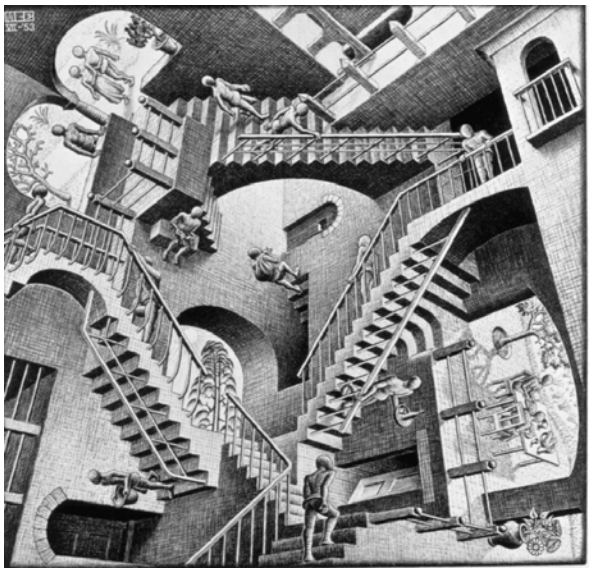
Medical Center for Sports and Business related Research, Gentsesteenweg, 132, B-8340, Sijsele, Belgium

Artevelde Highschool St.Lievenspoort Ghent, Belgium

- **Introduction:**

  Berqvist et al, Gerr et al, many others

  - **Concerning positioning the VDT**
    - **Numerous guidlines**
    - **Numerous standards**
  - **Present**
    - **Antropometrics**
    - **Biomechanical considerations**
  - **Critical reviews**
    - **Not always complete agreement**
  - **A number of studies**
    - **Relation between neck angle and MSD**



Introduction Aim Materials-methods Results Conclusion

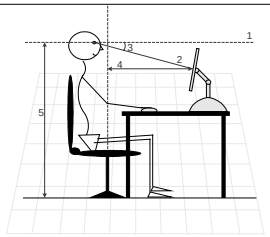
- **i Mac (Apple)**
- **In standardized way**
  - **Influence of the adjustable screen on the EMG parameters**
    - **Which VA lowest EMG activity**
    - **= VA self chosen position**
  - **Influence on workingspeed**
  - **Only the mouse as an input device**

Materials and method

N = 20	Mean (SD.)	Range
Age (years)	30.8 (10.7)	20 - 51
Height (cm)	163.7 (5.6)	154 - 174
Weight (kg)	58.7 (4.9)	52 - 71

- **All subjects were females and had an administrative profession**
- **All were right handed**
- **All subjects read and signed an informed consent**
- **None of them had neck and shoulder problems for at least 9 months**

Materials and method



- **Experimetal protocol**
  - **Everybody chosed her prefered sitting position**
  - **Parameters were captured**
    - **Position of the chair**
    - **Height of the chair**
    - **Seated eye height**
    - **Antropometric aspects**
      - **Trunk height**
      - **Arm lenght**

	Mean (SD.)	*Range*
Eye height during test (cm)	120.8 (5.5)	109 - 132
Screen-subject distance in high and low position (cm)	66.25 (6.4)	58 - 78
Screen-subject distance in self chosen position (cm)	58.6 (8.2)	47 - 73
Viewing angle (°)	20.0 (8.8)	0 - 43

  - **The table height remained unchanged at 74 cm.**

- **Experimetal protocol**
  - **3 x 20 minutes the same task**
    - **Randomised on 1 day**
    - **20 min. break**
  - **Task**
    - **Coulor the vowels of a non specific given text**

> **Deze rug- en nekproblematieken kennen binnen de zorgsector een zeer hoge incidentie. Met enorme socio-economische repercuties tot gevolg.**
> **De directie van het ziekenhuis tekende op het fonds in omdat dit in de lijn ligt van de reeds 18 jaar bestaande strategie (enkel fondsgerelateerd) om iets te ondernemen tegen het steeds hoger aantal rug- en nekproblematieken. Dit project kadert tevens in de missie van het Ziekenhuis waarbij gezondheid centraal staat.**
> **Via dit project kon het Ziekenhuis nu indirect iets doen**

- **So we created a constant visiual monitoring**
- **No human – keyboard interaction interfered the analysis**
- **Working speed was measured (nbr of vowels)**

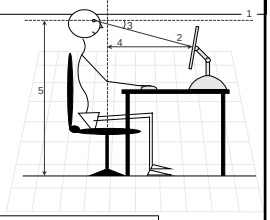
- **Experimetal protocol**
  - **With a different screen height**
    - **Two fixed**
    - **Third according best findings**

Highest

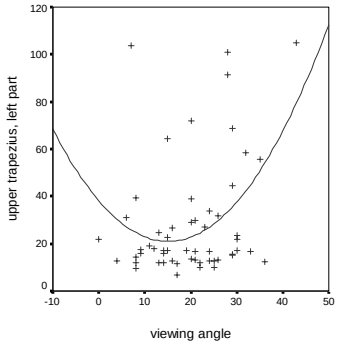
Lowest

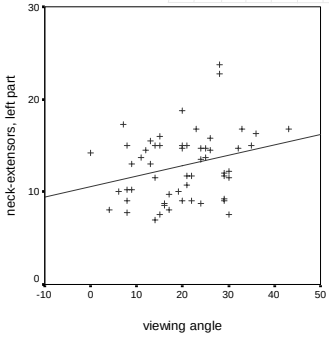
Participant

- **Experimetal protocol**
  - **EMG (surface)**
    - **ME 3000P8, Mega Electronics Ltd., Kuopio,Finland)**
    - **contact Ag/AgCl electrodes**
    - **placed symmetrically on both sides of the body parallel to the muscle fibre direction**
      - **(Zipp 1982, Traue et al. 1992, Jenson et al. 1993.)**
    - **preparation of the skin**
    - **location**
      - **(Introduction to surface electromyography 1998, Cram and Kasman)**
      - **Tapezius muscle (upper part)**
      - **Neck extensors (3 and 7 cm above C7)**
    - **The electrodes were not removed between the sessions**



- **Statistical analyses and results**
  - **Regression analyses was done**
  - **(SPSS 11.0) (Dep. Statistics Ugent)**





MA = 38.042 - 2.268 x VA + 0.075 x VA²
Lowest EMG at an angle 15 °

MA = 10.545 + 0.113 x VA
Lowest EMG at an angle 0°

- **Statistical analyses and results**
  - **The VA in the personal setting was 26° +/- 4° (mean +/- SD) !!!!**
  - **MSD ?**
- **Relating to the workspeed**
  - **A Wilcoxon test**

	High position	Low position	Self chosen position	**P value differences High-Self chosen**	P value differences Low-Self chosen	P value difference Low-High
Number of coloured vowels	320	332	341	**0.012**	0.225	0.294

- **Conclusion:**
  - **15 ° VA - the lowest EMG activity trapezius corresponds with Grandjean et al 1983**
  - **≠ self chosen VA (26°)**
  - **0 ° VA for the lowest EMG activity for the neck extensors**
    - **Due to a very small person**
      - **(the middle of the screen in the highest position is at eye level)**
    - **By increasing the number of measurements**
      - **Justify a quadratic model**
  - **Workspeed is highest at the self chosen position**

Thank you for your attention

IEA 2006 Congress Maatsricht Mensana, Belgium

Analysis of Ergonomic Findings at 2nd party auditing in European DuPont Sites

Willy Bohets, PhD Eur Erg

DUPONT The miracles of science™

DuPont

- USA - Multi-national chemicals and health care company
- Agriculture – Electronics – Energy – Packaging – Plastics – Safety and Protection
- Products : Teflon – Corian – Kevlar - Nomex

DUPONT

DuPont internal auditing system

- **1st party audits :**
  - **“walk through the workplaces”**
  - **carried out by people of their own site on a monthly basis;**
- **2nd part audits :**
  - **Systematic evaluation at technical and program level**
  - **Carried out by trained, certified auditors visiting other sites**

Analysis Audit Findings

The results of 37 OH audits have been analyzed with respect to the ergonomic related findings

TYPE	LEVEL
Regulatory	**Level 1** 10% **(immediate action needed)**
Policy 50%	**Level 2** 60% **(action within 6 weeks)**
Observation 50%	**Level 3** 30% **(action within 6 months)**

	Regulatory	Policy	Observation	total	%
level 1		9		9	8
level 2	3	37	35	75	63
level 3		9	25	34	29
total	3	55	60	118	
%	2	47	51		**100**

Analysis Audit Findings

Analysis versus the categories of the Corporate Ergonomics Standard

Management Commitment **(provide authority/resources – hold people responsible – program review)**	**4 %**
Employee Involvement **(opportunity to report hazards – select controls)**	**10 %**
Organisational structure / written program **(committee with representatives of all levels – written program with goals & communicated to employees)**	**13 %**

Workplace Assessment **(baseline survey – 1st party audits / action plan – Front End Loading process)**	**18 %**
Hazard Prevention & Control **(hierarchy of controls is respected – no PPE as prevention)**	**23 %**
Employee Education & Training **(training in place & documented)**	**13 %**
Manual Handling **(guidelines about general/specific lifting situations)**	**18 %**
Integrated Health Services (IHS) **(IHS involved in identification/elimination of MSD's)**	**1 %**

Recommendations for Improvement

Management commitment	**"Responsible Care Committee / Works Council" – direct way of reporting to management**
Employee Involvement	**- Ergonomics co-ordinator on site** **- Early Notification of Symptoms procedure**
Organisational structure / written program	**Ergonomics committee working with clearly defined COT's on a yearly basis**

Workplace Assessment	- **Baseline screening survey** - **measurements** - **1st party audits / Front End Loading**
Hazard Prevention & Control	**- Measures to prevent, eliminate or reduce ergonomic deficiencies : engineering – work practices – pauses / rotation / task enlargement – Best Practices**
Employee Education & Training	**Differentiate training for people at risk and people who deliver the program**
Manual Handling	- **Specific guidelines / limits for lifting – carrying – pushing/pulling** - **Using the available equipment**
Integrated Health Services (IHS)	**- Focus on primary prevention**

CONCLUSION

- **the DP auditing system allows to identify shortcomings in the site's ergonomic program as well as daily practices**
- **at site level there's still room for improvement in the field of workplace design, assessment methods/programs and manual handling practices**
- **Best Practices are available to support sites in a proactive approach to deal with ergonomic deficiencies**

The miracles of science™

Overzicht en impressies van het IEA 2006 congres

Jan Seghers
Faculteit Bewegings- en Revalidatiewetenschappen
K.U.Leuven
19-10-2006

IEA 2006 congres te Maastricht ...

- **Een 5-daags evenement met het 'state of the art' informatieaanbod op het vlak van ergonomie**
- **Een onmoetingsplaats voor "ergonomen" & "ergonomie-gebruikers"**
- **± 1,250 deelnemers uit 59 landen**

IEA 2006 congres te Maastricht ...

- Openings- en slotceremonie
- “IEA awards” ceremonie
- Congres party
- 18 ‘keynote lectures’
- 30 ‘interactieve’ workshops
- > 1000 presentaties verspreid over 200 sessies
- > 200 posters

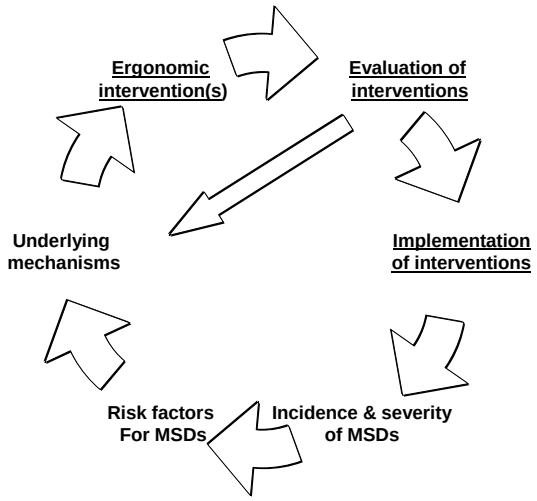
Meeting Diversity in Ergonomics

- De diversiteit in...
  - het vakgebied
  - toepassingen
  - de doelgroepen
  - ergonomen

Fysieke ergonomie

- Nauwelijks vooruitgang in de wetenschappelijke kwaliteit van ergo-checklists, instrumenten, methodologieën
  - **prEN 1005-5**, Safety of machinery Human physical performance Part 5: Risk assessment for repetitive handling at high frequency (Under Approval).
  - OCcupational Repetitive Action (OCRA) methode *(E. Occhipinti)*
- Gering aantal 'puur' wetenschappelijke studies
  - Ligt de wetenschappelijke ontwikkeling van de ergonomie wat stil?
  - "Gap" tussen wetenschappelijk onderzoek en praktijk?
  - IEA congres niet het juiste forum?
- Toenemend aantal kwaliteitsvolle 'epidemiologische' studies
  - = goede start voor interventies
- Kwaliteit van interventies verhogen door "Cost-effectiveness" en "Cost-benefit" analyse
- Implementatie van resultaten van interventies op "grote schaal"

Sequence of prevention



Fysieke ergonomie

- **Nieuw fenomeen = "Underloading" of workers**
  - Ergonomics focuses on creating a work layout that places work items in convenient locations requiring minimal movement frequency and strength
    - = minimize the risks <u>but</u> minimize the activity level
  - Whole body inactivity
  - Neck-schoulder *inactivity* -> lack of "variation" in activity
  - Interactieve sessie "Recommendations for sufficient physical activity at work"
  - Recommendation
    - ≥ 30 minutes of moderately vigorous physical activity
  - Macroergonomics and the Obesity Epidemic, *A. Hedge*
    - creating an organizational climate that supports a culture of movement.

Organizational Design and Management

- ~ MacroErgonomic Analysis and Design (MEAD)
- ~ Systeemergonomie
  - investigating the sub-systems of a work system:
    - environmental sub-system
    - technological sub-system
    - personnel sub-system
    - internal environment
    - organizational design.
- ~ Total Quality Management

Participatieve ergonomie

- **Ergonomics by non-Ergonomists – danger, threat or opportunity? C. Williams**
  - A more positive approach would look for the benefits brought by raising awareness of the importance of ergonomics by having a broad spectrum of professionals espousing its virtues. *Raising the level of awareness in ergonomics amongst professionals in allied disciplines should mean better systems, products, workstations and work routines* are designed by the application of ergonomics principles.
  - It should also mean that *where the issues become complicated, it is Ergonomists who are the first port of call rather than simply engineers, designers, or human resources professionals*.

Productergonomie

- Designing for diversity = designing for all
- Kansei Engineering = an ergonomic customer-oriented product development technology.
  - Kansei (Japans) = customers' desire and feeling
- Virtual Reality in Ergonomics
- IEA technical committee EQUID
  - Ergonomics QUality In Design
  - The EQUID committee develops and manages activities related to the use of ergonomics knowledge and methods in the design process of products, work systems and services.
  - Establishment of a certification for ergonomics quality in design (EQUID) program.
- IEA conference on Design in Ergonomics and EQUID Forum
  - Berlijn, 31 may - 1 june 2007.

Diversiteit aan doelgroepen

- **Kinderen -> Ouderen**
  - Ergonomics for children & educational environments
- **Validen -> minder-validen**
- **IEA technical committee on "Gender and Work"**
  - **http://www.iea.cc/events/genderandwork.pdf**
- **Culturele verschillen**
  - Ergonomics in Industrial Developing Countries (IDc)

'human'-powered work

Enkele opmerkelijke bijdragen...

- **Sleepiness in working teens attending evening classes - Brasil**
  - Teen work can have negative effects on quality of life, and school development.
- **The Shock absorption performance of an airbag system for fall of wheelchair – Japan**
- **Evaluation of cross-walk timing and the application of a standard crossing light timing formula - USA**
  - The results of this study indicate that roadway crosswalk timing is inadequate for school aged children and results in increased risk due to children rushing (running) across the remaining distance of the roadway to access the sidewalk before the street light changes.

Photo5: Oval type


See you all in China,
Beijing for IEA 2009
http://www.iea2009.org/
2009