

Physical ergonomics at computer workplaces: Findings from ergonomic workplace assessments and interviews

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Overview

1. Background
2. Objectives
3. Methods
4. Results
5. Recommendations
6. Discussion/Questions



1. Background I

- Physical work environment factors (e.g. design of desks, office chairs, computer keyboards, mice, ...) as well as context factors, (e.g. ambient noise, draft, lighting, temperature, etc.) can influence the **performance of the people working at computers**.
- These factors can also **represent risk factors for health problems**.
- Translators spend **long hours sitting** at computer workstations, keying in text, scrolling through electronic documents, and searching for information on the web and databanks.
- Entering text and using input devices such as touchpads or mice are activities which involve the whole body, and not just the hands and lower arms; constant repetition of movement can cause an **overload** of muscles of the **upper extremities and back**.

1. Background II

- Studies show that **hand and wrist tendonitis**, Carpal Tunnel Syndrome, Cubital Tunnel Syndrome, and epicondylitis are diseases typically associated with translation work. (de Léon 2007; Lavault-Olléon 2011)
- Explanations for those are: arrangement of letters and other keys on keyboards is **not based on ergonomic considerations** and non-physiological movements are needed to type. (Pineau 2011)
- **Eyestrain** due to long hours peering at a computer monitor can cause vision problems, known as Computer Vision Syndrome, which can present as headaches, ocular discomfort, dry eye, diplopia, and blurring. (Rosenfield 2011)

2. The Project

Study about physical ergonomics is part of a larger project comprising:

- **Workplace observations (n=36)**
- Usability lab observations (Pro=18; MA=12)
- Online survey (n=1,850)
- **In-depth interviews (n = 7)**



2. Study Objectives

Investigating:

- Which health complaints do language professionals working with computers report?
- Which health complaints are related to physical ergonomic factors?
- Are there differences in physical ergonomics between the employment situations?

... in order to make recommendations for more ergonomic workplaces.



3. Methods

- **36 workplace visits** to language professionals working as:
 - freelancers
 - staff in a commercial enterprise (e.g. LSP)
 - staff in an institution
- Assessment of workplaces **regarding ergonomics**
- Screen recordings and video recordings of translation activities
- **Interruptions and disturbances** were noted (RIHA/VERA)
- A **short interview** concerning socio-economic data and **health issues** possibly related to physical ergonomics
- **In-depth interviews** with 7 participants at the end of the study

3. Characteristics of sample and workplaces

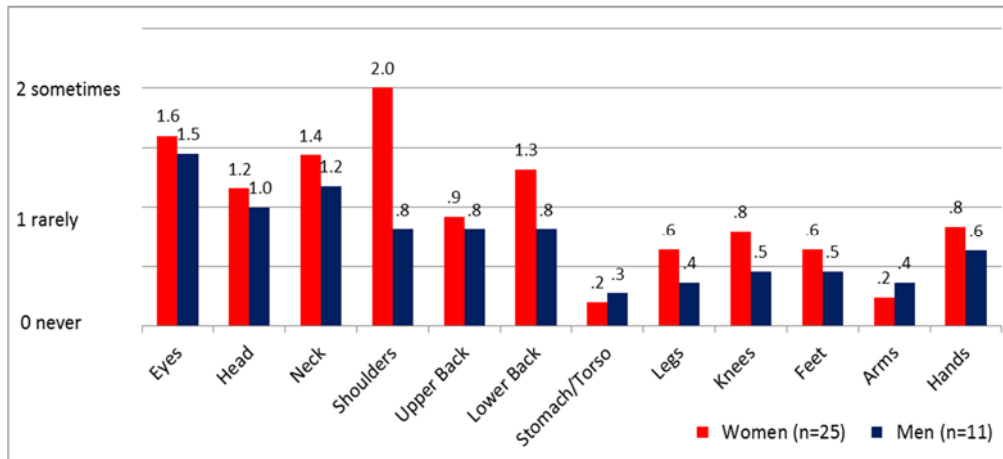
Characteristic	Sub-groupings		
Sex	female (n=25)	male (n=11)	
Age	18-45 (n=16)	45 and over (n=19)	
Employment	freelancer (n=10)	commercial (n=9)	institutional (n=17)
Cat tool use	High (n=20)	Low (n=11)	
Office type	Private (n=21)		
	Semi-private (1 other) (n=6)		
	Shared (>1 other) (n= 7)		

4. Results of workplace observations: assessments

Aspect	Ergonomic	Problematic
Ambient noise	up to 65 dB (n=27)	over 65 dB (n=9)
Temperature	up to 23° C (n=8)	over 23° C (n=28)
Lighting	adjustable (n=17)	non-adjustable (n=19)
Desk height	appropriate for user (n=17)	too high or low (n=19)
Chair height	adjusted correctly for user (n=17)	not adjusted correctly (n=19)
Chair back	movable (n=19)	static (n=16)
Feet	can touch ground (n=22)	cannot touch ground (n=14)
Screen height	5-10 cm under eye level (n=8)	too high (n=28)
Screen distance	60-80 cm away (n=25)	too far (n=11)
Keyboard	10-15 cm from desk edge (n=14)	too close or far away (n=22)
Documents	between keyboard + screen (n=13)	not in front of person (n=18)

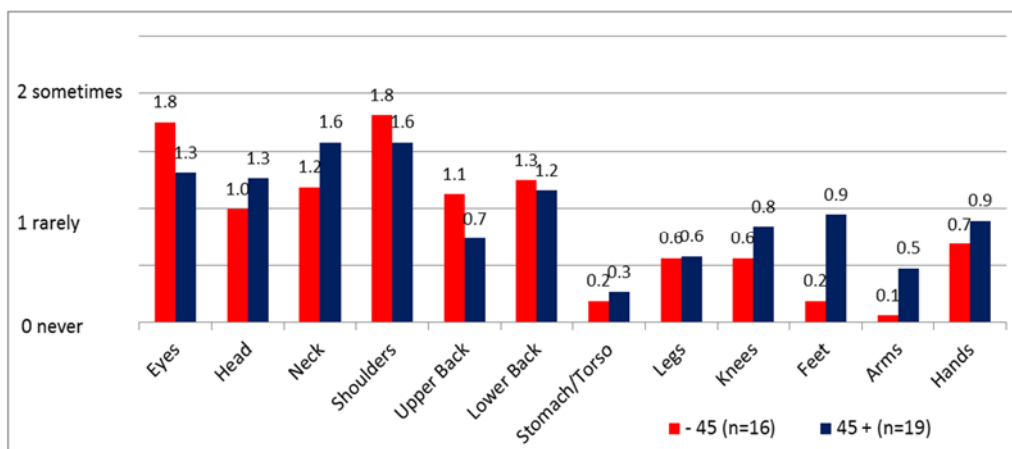
4. Results of workplace observations: Interviews

Occurrence of recent health complaints **by sex**



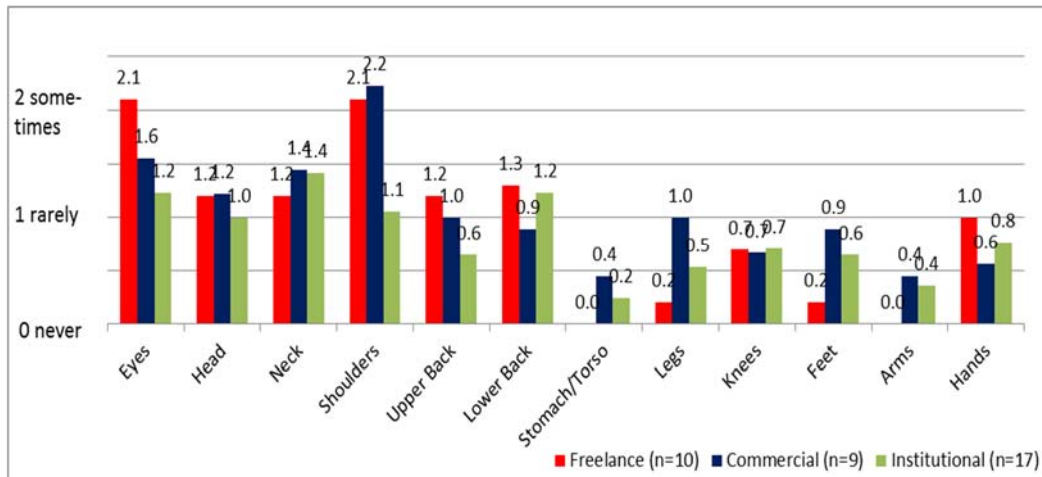
4. Results of workplace observations: Interviews

Occurrence of recent health complaints by **age category**



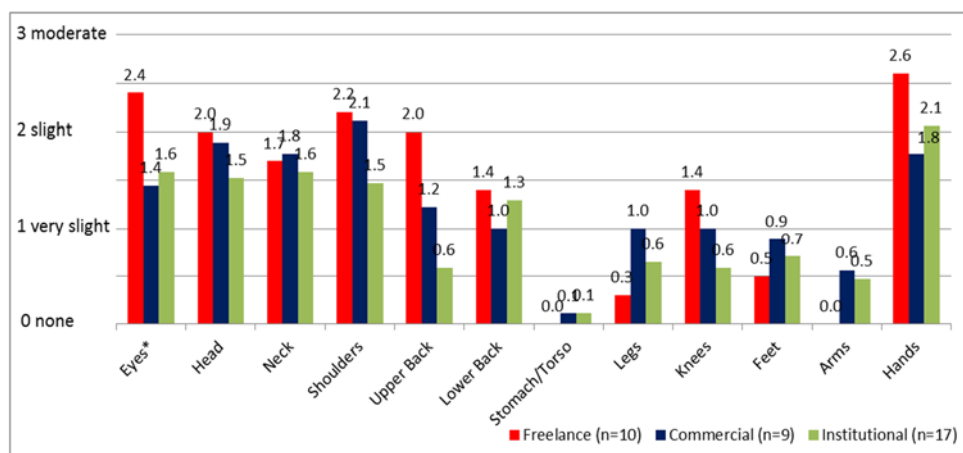
4. Results of workplace observations: Interviews

Occurrence of recent health complaints **by employment position**



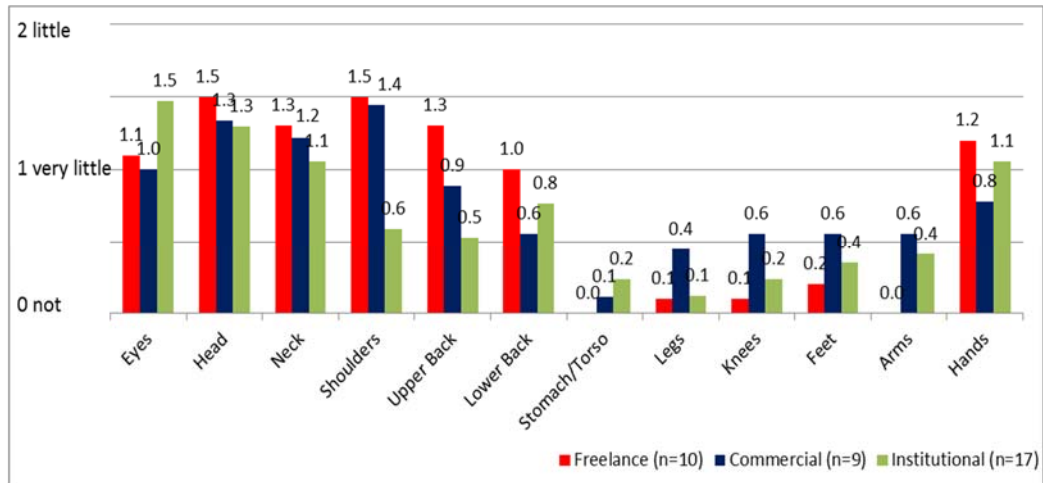
4. Results of workplace observations: Interviews

Intensity of pain or discomfort **by employment position**



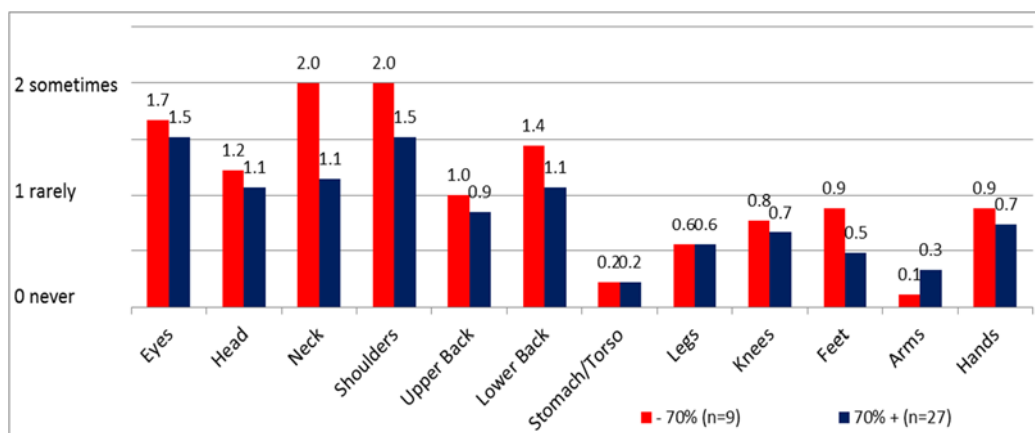
4. Results of workplace observations: Interviews

How much affected in daily life **by employment position**



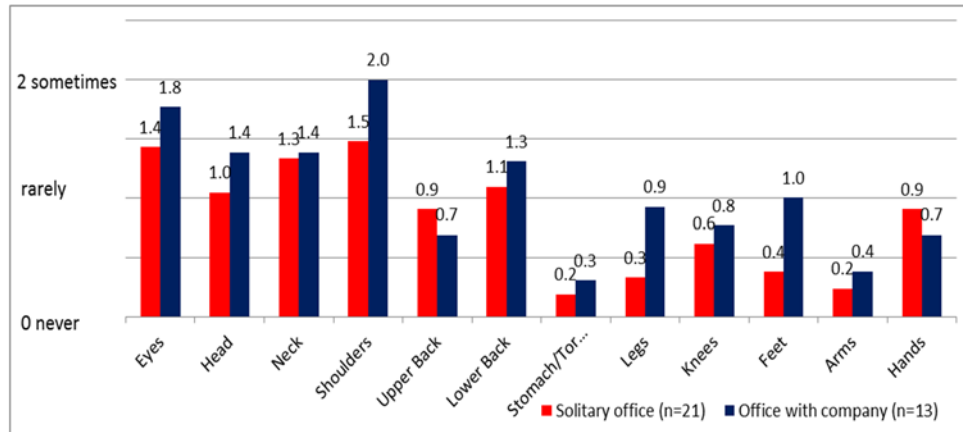
4. Results of workplace observations: Interviews

Health complaints lately **by full/part time employment**



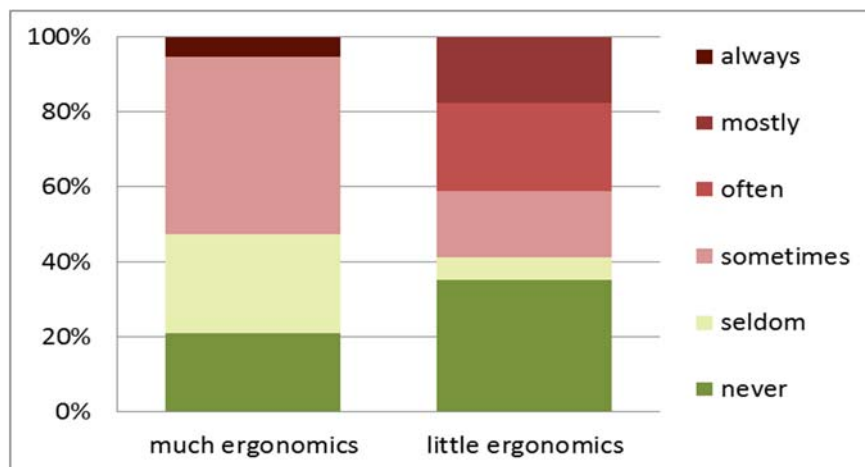
4. Results of workplace observations: Interviews

Health complaints lately **by office type**



4. Results of workplace observations: Interviews & observations

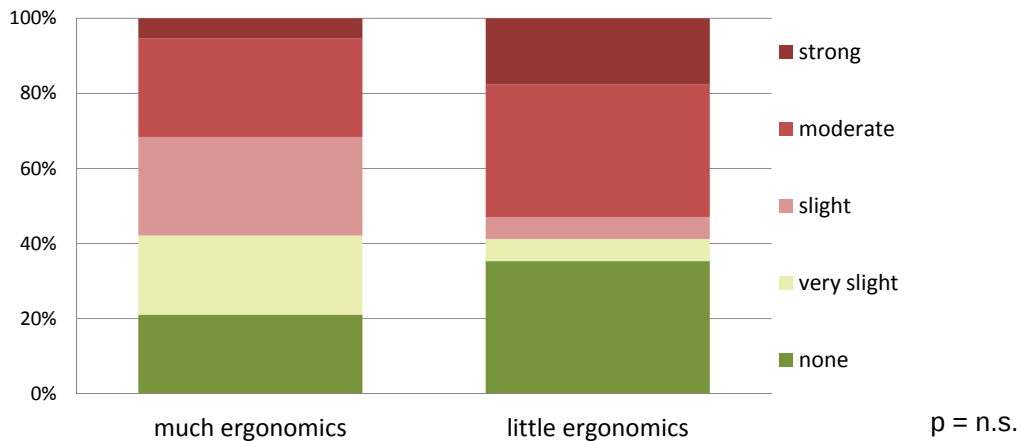
Recent health complaints in comparison to ergonomics: **Shoulders**



$p < 0.05$

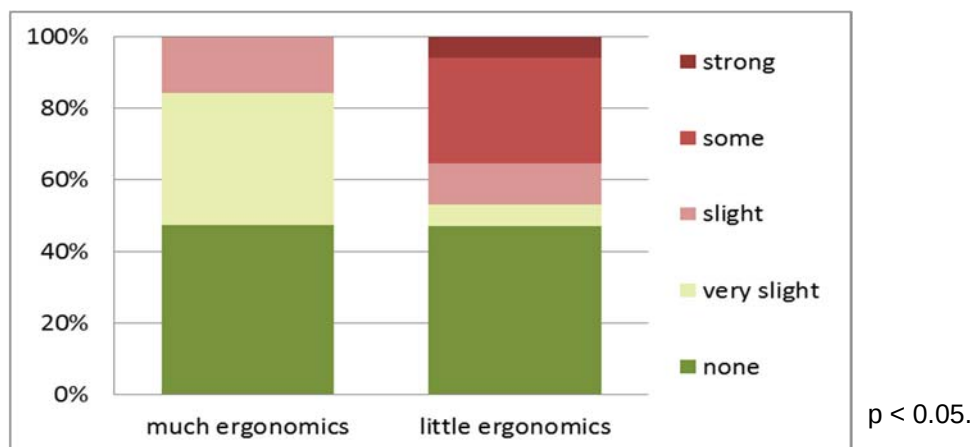
4. Results of workplace observations: Interviews & observations

Intensity of health complaints in comparison to ergonomics: **Shoulders**



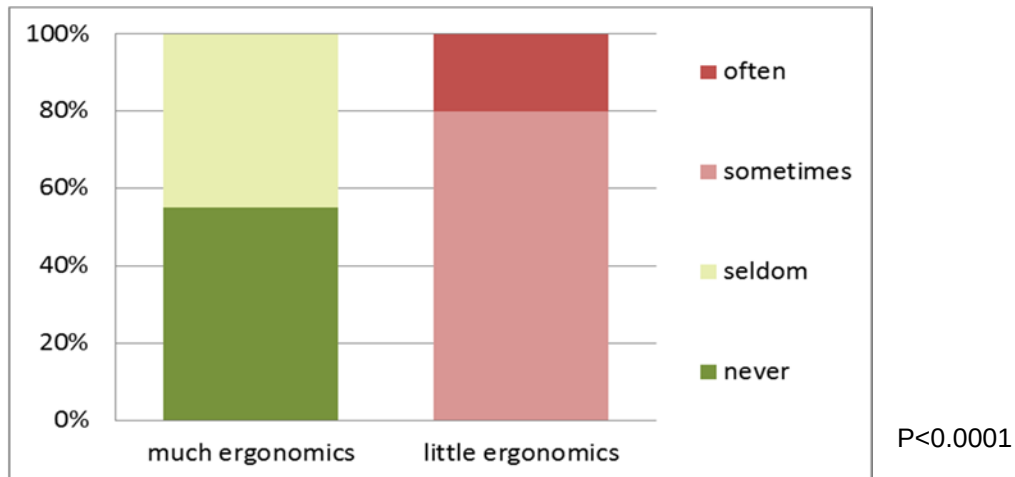
4. Results of workplace observations: Interviews & observations

Impact of health complaints in daily life in comparison to ergonomics:
Shoulders



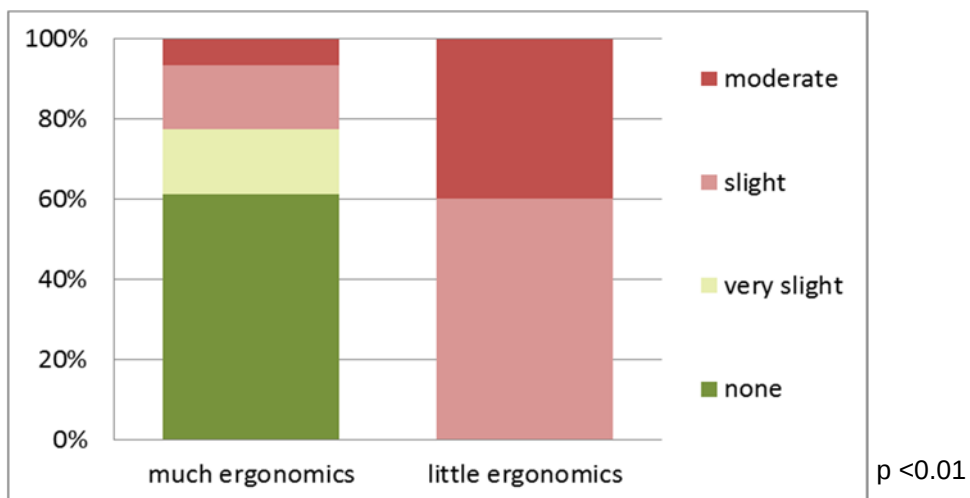
4. Results of workplace observations: Interviews & observations

Recent health complaints in comparison to ergonomics: **Knees**



4. Results of workplace observations: Interviews & observations

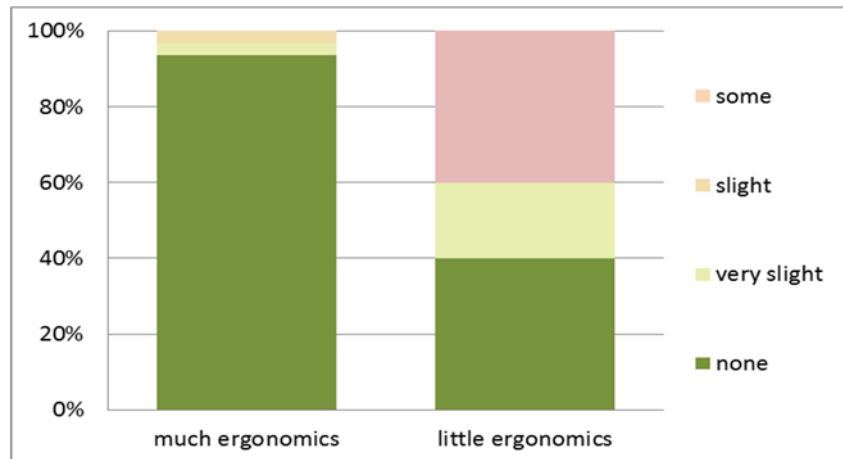
Intensity of health complaints in comparison to ergonomics: **Knees**



4. Results of workplace observations: Interviews & observations

Impact of health complaints in daily life in comparison to ergonomics:

Knees



$P < 0.001$

4. Results of workplace observations: Interviews & observations

- Fewer health complaints/intensity/impact were mostly related to a more ergonomic workplace:
 - Eyes
 - Neck
 - Shoulders
 - Upper back
 - Torso
 - Legs
 - Hands
- But not for lower back, feet and head.
- Most observed differences were below statistical significance.

4. Results of in-depth interviews: Interventions at the workplace

- In the validation phase of the project, a subset of each group of translators was asked to participate in an in-depth interview.
- They were chosen based on the workplace profiles that emerged from the analyses as being particularly relevant to issues of cognitive and physical ergonomics.
- Participants were asked about the ergonomic interventions, whether they had changed their workplace after the intervention, and whether it had had any impact on their general well-being.

4. Results of in-depth interviews: Interventions at the workplace

		Interviewee						
		I	II	III	IV	V	VI	VII
Chair	Chair height adjusted							
	Back rest adjusted	X	X		X		X	
	Armrests adjusted	X						
Desk	Set to right height	X					X	
	Change position to improve inadequate lighting	X						
Screen	Height adjusted				X	X	X	
Keyboard	Put flat on desk	X	X			X	X	
	Pull closer to the body	X	X		X			
Air quality								
	Air is too dry use humidifier			X				
Breaks	Increase frequency of breaks	X						
Posture	Change sitting position more often	X				X	X	

4. Results of in-depth interviews: Interventions at the workplace

- After the intervention, most translators kept their workplace the way the occupational therapist had set it up.
- In some cases some, small optimisations had been made (e.g. addition of hand rest, stability ball, etc.).
- One freelancer entirely reorganised her workplace based on the recommendations of the OT.
- After the workplace observations, one participating organisation purchased ergonomic chairs for all of their employees.

4. Results of in-depth interviews: Interventions at the workplace

- Most participants stated that they were much more aware of ergonomics now.
- They took small breaks more often and were more aware of their posture.
- Some interviewed participants stated that they were taking more responsibility for their health and changing their posture during work more often, or doing more sports, etc.
- Some stated that this was affecting their health in a positive way.

4. Results of in-depth interviews: Interventions at the workplace

Exp VI 00:03:05 : Aber ja, ich merke schon, wenn ich mir Mühe gebe, aufrecht zu sitzen, dass ich dann weniger verspannt bin, auf jeden Fall. Ich schaue jetzt eigentlich schon mehr darauf, dass eben der Tisch zum Beispiel genug tief eingestellt ist.

But yes, I notice when I make the effort to sit upright, that I'm less tense, for sure. I pay more attention, for example, to making sure that the [desk] surface is set low enough.

4. Other findings

- **Standard for ergonomics** at the workplaces in the companies and institutions in this study was **high**.
- Ergonomics at freelancers workplaces was often **sub-optimal**.
- Participants often said they had had **health complaints in the past** (e.g. back pain) that decreased or ceased after changing aspects of their workplace to be more ergonomic (e.g. ergonomic chair).
- Ergonomic features existed at many workplaces; however, they were **not adjusted for the person using them**.

4. Challenges of current study: Limitations

- **Recruitment was difficult:** some companies were resistant to having their employees take part in the study. The targeted 50 workplace observations could not be achieved (n=36).
- Observed participants generally had **few health complaints** and generally quite ergonomic workplaces.
- Participants often had **more than one position** (e.g. freelancer and part-time staff translator at a company or government), so they had **more than one workplace**.
- Statements of **cause and effect** are **not possible** with this data/study design (e.g. part-time workers had more complaints).

5. Recommendations

- As problems were more often observed among freelancers and younger professionals, we recommend that:
 - basic **ergonomic knowledge** be integrated into **BA and MA programmes**.
 - ergonomic training be provided to practitioners in further education.
 - information about ergonomics be disseminated through professional associations and similar channels.
 - change position from time to time and take frequent short breaks.
- An **individual workplace consultation** is recommended before any health problems emerge.

Literature

de León, M. E. (2007). *Ergonomics for translators and interpreters*. AbroadLink. <http://www.abroadlink.com>,

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Thank you for your attention!



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