Research in hairdressers
Tasks, posture and MSDs

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Berufsgenossenschaft
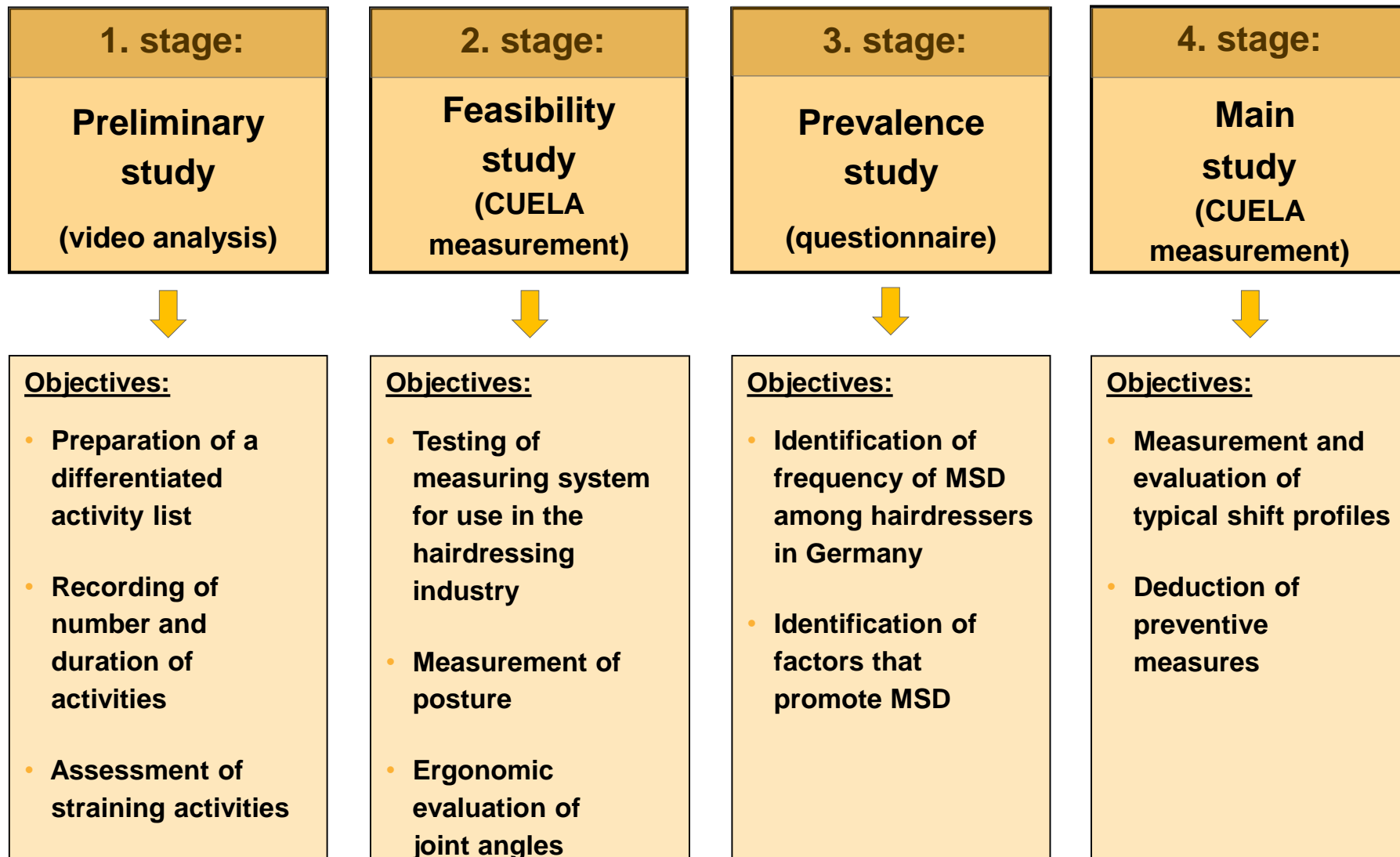für Gesundheitsdienst
und Wohlfahrtspflege

Overview

- **Background**

- **Objectives of the four-stage research project**

- **Methodologies and results of stages 1 to 3**

- **Outlook (stage 4)**

- **Summary**

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Background

- **MSD most common reason for incapacity to work among hairdressers** (Data from German health insurers, 2011)

- **International prevalence rates of MSD among hairdressers between 21% and 71%; many studies from outside the EU**

- **Only one metrological study on posture; only shoulder joint along one plane of movement was analysed**

- **No study on differentiated activity analyses, only a differentiation between working with customers and auxiliary functions**

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Study overview and objectives

1. stage:	2. stage:	3. stage:	4. stage:
Preliminary study **(video analysis)**	**Feasibility study** **(CUELA measurement)**	**Prevalence study** **(questionnaire)**	**Main study** **(CUELA measurement)**

Objectives:

- **Preparation of a differentiated activity list**

- **Recording of number and duration of activities**

- **Assessment of straining activities**

Objectives:

- **Testing of measuring system for use in the hairdressing industry**

- **Measurement of posture**

- **Ergonomic evaluation of joint angles**

Objectives:

- **Identification of frequency of MSD among hairdressers in Germany**

- **Identification of factors that promote MSD**

Objectives:

- **Measurement and evaluation of typical shift profiles**

- **Deduction of preventive measures**

1. stage: preliminary study

Objectives:

- **Preparation of activity list**

- **Recording of number and duration of individual activities**

- **Assessment of potentially straining activities**

Methodology:

- **Video analysis of five hairdressers in five salons during a shift**

- **Attended to 46 clients**

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1. stage: results

Kategorie 1, Tätigkeiten	Kategorie 2, Teiltätigkeiten
Waschen	nass machen/ausspülen
	einschäumen
	Handtuch umwickeln
	mit Handtuch reiben/abtrocknen
Schneiden	a) mit Schere
	b) mit Elektrorasierer
	c) mit Ausdünnschere
	d) mit Klinge
	Haare abteilen und befestigen
Fönen	a) Fön schwingen
	b) mit Rundbürste
	c) mit Diffuser
	Haare abteilen und befestigen
Färben	a) Strähnen
	b) Ansätze
	c) gesamtes Haar
	d) Wimpern/Augenbrauen
	Haare abteilen und befestigen
	Farbe anmischen
	Folien/Farbe entfernen

Styling	Toupieren
	Haare legen und Haarspray/Gel auftragen
reine Kommunikation	Begrüßung/Beratung/Gespräch
Tresenarbeiten	Kassieren/Eintragungen/Termin vereinbaren
	Telefonieren (und Termin eintragen)
Nebentätigkeiten	Umhang/Halsschutzkrause/Handtuch/Pappiertuch umlegen/abnehmen
	Kämmen/Bürsten
	Haarreste entfernen
	Schaumfestiger/Flüssigkeit in Haare verteilen/sprühen
	Hände waschen und abtrocknen
	Handschuh an-/ausziehen
	mit Handspiegel Frisur zeigen
	Trockenhaube aufsetzen/einstellen/entfernen
	Hilfsmittel holen Bsp.: Werkzeug, Rollhocker, Farbkarte, Zeitung, Getränk
	sonstige Nebentätigkeiten Bsp.: sich Schürze umbinden, Kundenstuhl/Waschbecken verstellen, Kundenjacke aufhängen, Hilfsmittel vorbereiten, Handtücher aufhängen/zusammenlegen
Ordnung/Sauberkeit	Fegen
	Aufräumen/Putzen
	Abwaschen/Abtrocknen
Pause	Pause
Sonstiges	Ohrlöcher stechen
	Ausbildung Azubi

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1. stage: results

Ranking	Activities (46 clients)		
	Frequency [n]	Duration [min]	Proportion of time [%]
1st	Cutting (40)	Colouring (21)	Cutting (20)
2nd	Styling (34)	Perming (14)	Colouring (12)
3rd	Washing (31)	Cutting (13)	Blow-drying (7)
4th	Blow-drying (31)	Brows (12)	Washing (6)
…	…		< 5%

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1. stage: results

2. stage: feasibility study

Objectives:

- **Testing of measuring system for use in the hairdressing industry**

- **Recording and evaluation of joint angles during the 4 main activities** (cutting, colouring, blow-drying and washing)

Methodology:

- **Measurement of a hairdresser and three hair models (short, medium and long) under laboratory conditions**
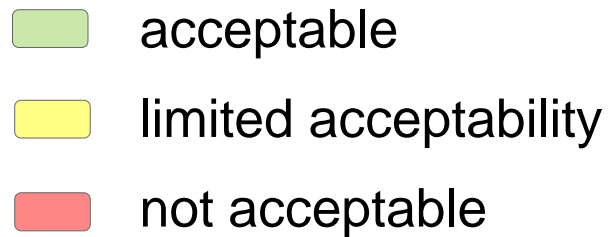
CUELA measurement system

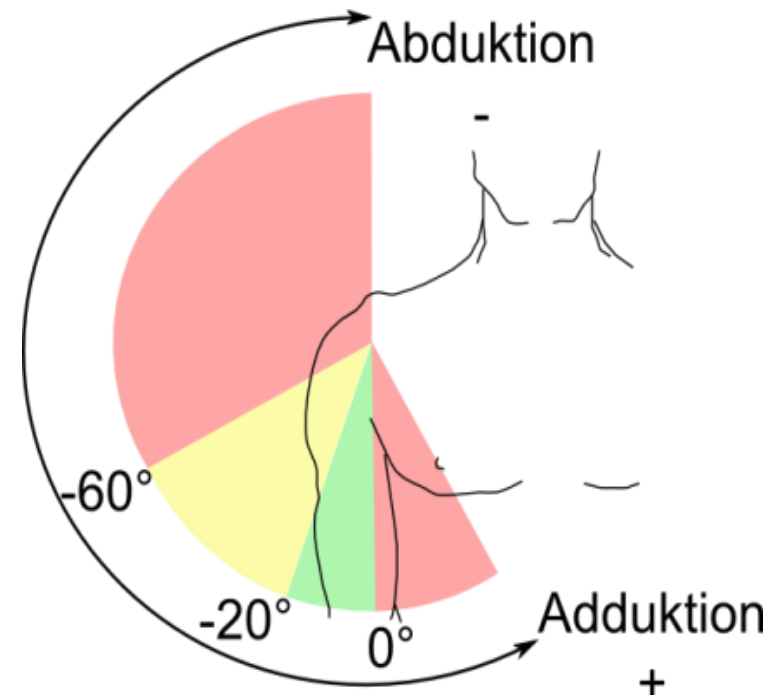(CUELA: German abbreviation for „computer-assisted recording and long-term analysis of musculoskeletal loads")

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2. stage: ergonomic evaluation

How can postures be evaluated?

- **Magnitude**

- **Duration (static postures)**

- **Frequency**

acceptable

limited acceptability

not acceptable

(DIN EN 1005-4, ISO 11226)

2. stage: results

Joint	Direction of movement	Cutting Proportion of time (%)		Colouring Proportion of time (%)		Blow-drying Proportion of time (%)		Washing Proportion of time (%)	
		left	right	left	right	left	right	left	right
Shoulder	Flexion	46	55	28	28	16	49	16	8
	Extension	17	10	16	11	48	7	17	18
	Abduction	61	43	56	27	94	50	47	14
	Adduction	6	13	4	15	0	2	4	17
Elbow	Pronation	21	64	36	56	13	56	34	64
	Supination	4	1	19	2	17	3	20	2
	Flexion <60°	6	6	10	14	1	4	18	18
	Flexion >100°	25	6	19	18	35	3	2	1
Hand	Flexion	3	3	1	1	6	6	1	3
	Extension	28	8	14	4	4	12	26	1
Back	Curvature	66		36		12		62	
	Rotation	5		2		1		1	
	Incline to the left	17		11		10		13	
	Incline to the right	12		10		10		4	

2. stage: results - repetition

Joint	Direction of movement	Cutting Repetition (no./min)		Colouring Repetition (no./min)		Blow-drying Repetition (no./min)		Washing Repetition (no./min)	
		left	right	left	right	left	right	left	right
Shoulder	Flexion/ extension	7*	10*	12*	15*	19*	14*	14*	11*
	Abduction/ adduction	8*	10*	7*	12*	10*	15*	12*	8*
Elbow	Pronation/ supination	18*	24*	14*	27*	23*	28*	23*	15*
	Flexion/ extension	7	14*	7	13*	13*	14*	18*	13*
Hand	Flexion/ extension	13*	24*	8	33*	23*	50*	16*	19*

Joint	Reference values for a high degree of repetitiveness (according to Kilbom, 1994)
Shoulder	> 2.5/min
Elbow	> 10/min
Hand	> 10/min

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2. stage: limitations

- **Only one test subject (senior hairdresser)**

- **Very well trained and physically fit**

- **=> Variety of possible working techniques, which have not been measured**

- **=> Real average values likely to be significantly higher**

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3. stage: prevalence study

- **1280 businesses contacted by telephone**

- **550 businesses participated**

- **2159 questionnaires dispatched**

- **889 questionnaires returned**

  => Response rate: 41.2%

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3. stage: results

Gender	Frequency [%]
Women	90.6
Men	9.4

Age	[%]
< 20	5
20 – 29	28
30 – 39	16
40 – 49	24
50 – 59	19
>= 60	8

Level of training	Frequency [%]
Trainee	9.2
Fully-trained hairdresser	52.8
Senior hairdresser	35.4
Other	2.5

Occupational status	[%]
Employed	69.8
Self-employed	28
Employed and self-employed	2.2

● **Reduction of working hours due to MSDs: 13.4%**

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Nacken

Schulter

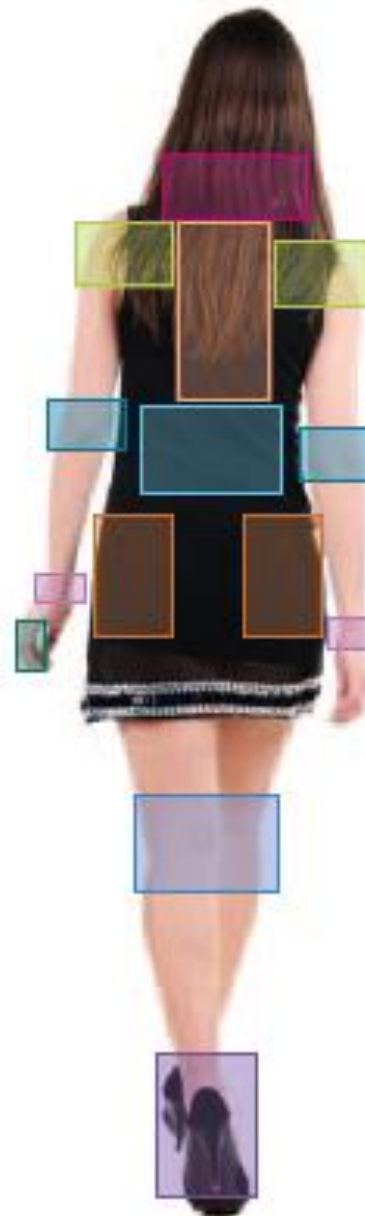Oberer Rücken

Unterer Rücken
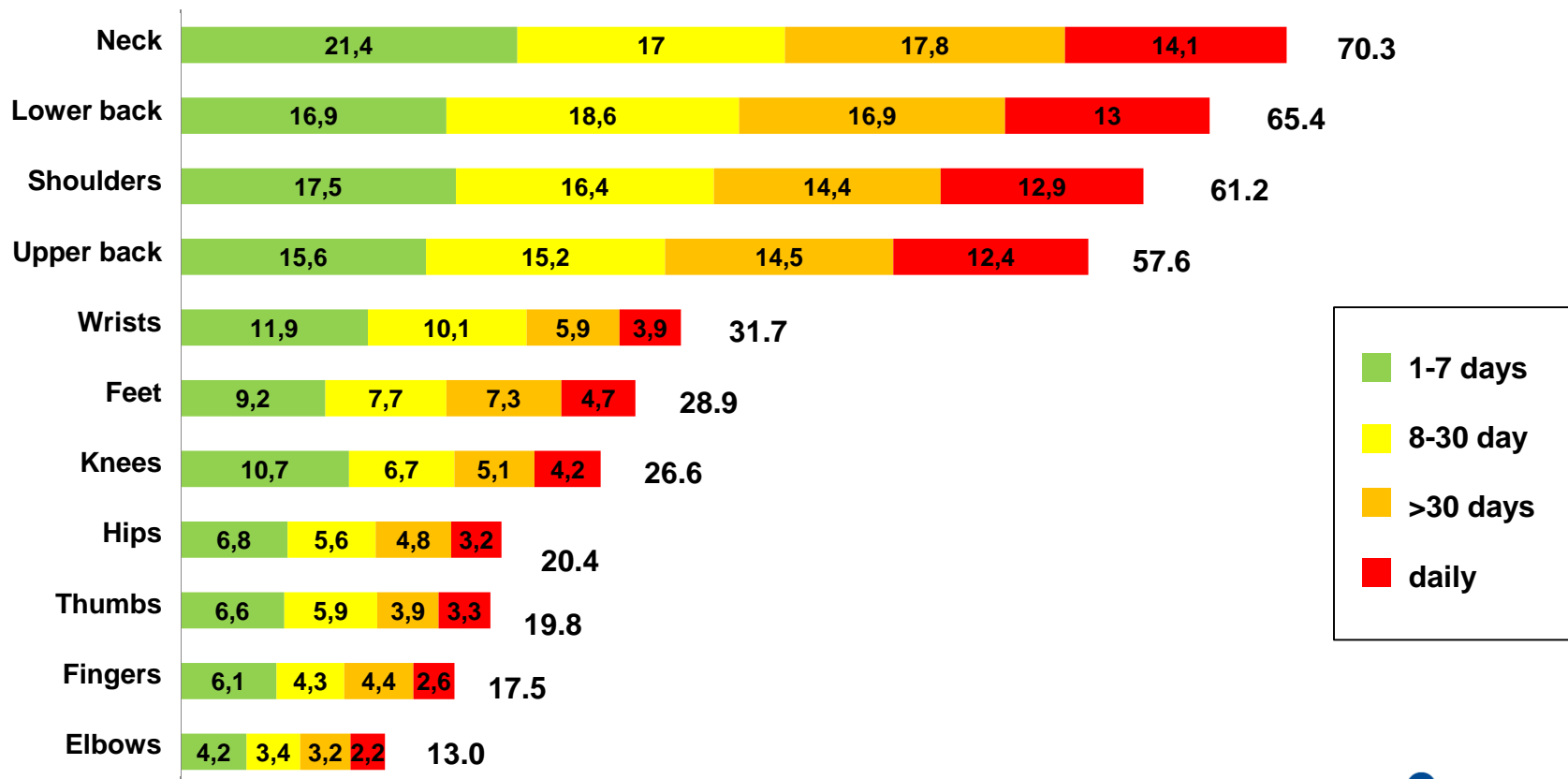
Ellenbogen

Handgelenk

Daumen

Übrige Finger

Hüfte

Kniegelenk

Fuß/Fußgelenk

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3. stage: results

Disorders in the last 12 months (%)

Body part	1-7 days	8-30 day	>30 days	daily	Total
Neck	21,4	17	17,8	14,1	70.3
Lower back	16,9	18,6	16,9	13	65.4
Shoulders	17,5	16,4	14,4	12,9	61.2
Upper back	15,6	15,2	14,5	12,4	57.6
Wrists	11,9	10,1	5,9	3,9	31.7
Feet	9,2	7,7	7,3	4,7	28.9
Knees	10,7	6,7	5,1	4,2	26.6
Hips	6,8	5,6	4,8	3,2	20.4
Thumbs	6,6	5,9	3,9	3,3	19.8
Fingers	6,1	4,3	4,4	2,6	17.5
Elbows	4,2	3,4	3,2	2,2	13.0

Legend:
- 1-7 days
- 8-30 day
- >30 days
- daily

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3. stage: results – influencing factors

	Neck OR (crude)	Shoulders OR (crude)	Upper back OR (crude)	Lower back OR (crude)
BMI	-	-	-	-
Freelance (yes)	-	-	-	-
Sex (female)	2.3	-	-	-
Age (Jahre)	1.017	1.026	-	1.016
Job experience (years)	1.016	1.025	-	1.013
Working hours per week	-	-	1.012	-
Working hours reduced (yes)	3.6	4.2	2.5	2.5

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4. stage: main study / outlook

- **Identification of typical work and shift profiles**

- **Ergonomic evaluation of these profiles**

- **=>   Identification of physiological and non-physiological movement sequences**

- **=>   Identification of preventive measures**

- **=>   Making hairdressers aware of non-physiological postures / movements**

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Summary

- **Hairdressing involves many different activities**

- **Multiple stressful postures and repetitive movements**

- **Higher proportion of MSDs primarily in the neck, shoulders and upper and lower back**

- **Huge potential for ergonomic improvements**

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Thank you very much for your attention.