Original article

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Carpal tunnel syndrome and manual work: the OCTOPUS cohort, results of a ten-year longitudinal study [1]

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[1] *Supplementary material*

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Supplemental table 1. Baseline characteristics according to participation in nerve conduction studies (only symptomatic workers were invited to undergo this examination). The OCTOPUS cohort, Italy, 2000-2011.

	Symptomatic workers that accepted to undergo NCS (n=637)				**Symptomatic workers that refused to undergo NCS (n=245)**			
Characteristics at baseline	**N**	**%**	**Mean**	**SD**	**N**	**%**	**Mean**	**SD**
Women	531	83.4	·	·	190	77.6	·	·
Age (years)	·	·	40.7	(9.1)	·	·	40.3	(9.8)
BMI (kg/m^2)	·	·	24.5	(4.2)	·	·	24.4	(4.6)
Predisposing diseases[a]	113	14.7	·	·	34	13.9	·	·
ACGIH TLV® categories								
– Below AL	301	47.3	·	·	131	53.5	·	·
– Between AL and TLV	104	16.3	·	·	42	17.2	·	·

– Above TLV	232	36.4	·	·	72	29.4	·	·

Abbreviations: AL, action limit; BMI, body mass index; CTS, carpal tunnel syndrome; NCS, nerve conduction studies; SD, standard deviation; TLV, threshold limit value.

[a]This group includes: diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus.

Supplemental Table 2. Incidence rates (per 100 person-years) of CTS confirmed by nerve conduction studies in the studied population by ACGIH TLV® method and personal characteristics. The OCTOPUS cohort, Italy, 2000-2011.

	Biomechanical exposure classified according to ACGIH TLV® method											
	Below AL				**Between AL and TLV**				**Above TLV**			
	Cases	**Pyrs**	**IR**	**95%CI**	**Cases**	**Pyrs**	**IR**	**95%CI**	**Cases**	**Pyrs**	**IR**	**95%CI**
Entire cohort	51	5362	1.0	0.7–1.3	36	1237.5	2.9	2.1–4.0	39	2283.5	1.7	1.3–2.3
Sex												
Male	18	2800.5	0.6	0.4–1.0	6	406.5	1.5	0.7–3.3	7	890.5	0.8	0.4–1.6
Female	33	2561.5	1.3	0.9–1.8	30	831	3.6	2.5–5.2	32	1393	2.3	1.6–3.2
Age (years)												
Up to 35	8	2314.5	0.3	0.2–0.7	6	471.5	1.3	0.6–2.8	6	1062.5	0.6	0.3–1.3
36–45	21	1971.5	1.1	0.7–1.6	19	490	3.9	2.5–6.1	11	726.5	1.5	0.8–2.7
46–55	20	1008	2.0	1.3–3.1	9	267	3.4	1.8–6.5	22	472.5	4.7	3.1–7.1
More than 55	2	68	2.9	0.7–11.8	2	9	22.2	5.6–88.9	0	22	0	·
Body mass index (kg/m^2)												
<25	22	3647.5	0.6	0.4–0.9	21	855.5	2.5	1.6–3.8	17	1548	1.1	0.7–1.8
25.0–29.9	19	1344.5	1.4	0.9–2.2	8	286.5	2.8	1.4–5.6	18	597	3.0	1.9–4.8
30.0 or more	10	370	2.7	1.5–5.0	7	95.5	7.3	3.5–15.4	4	138.5	2.9	1.1–7.7

Predisposing diseases[a]												
None	46	5103	0.9	0.7–1.2	35	1166.5	3.0	2.2–4.2	26	2140.5	1.2	0.8–1.8
At least one	5	259	1.9	0.8–4.6	1	71	1.4	0.2–10.0	13	143.0	9.1	5.3–15.7

Abbreviations: ACGIH, American Conference of Government Industrial Hygienists; AL, action limit; CTS, carpal tunnel syndrome; IR, incidence rate; Pyrs, person-years; TLV, threshold limit value; 95%CI, 95% confidence intervals.

[a]This group includes: diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus.

Supplemental Table 3. Baseline characteristics according to follow-up status. The OCTOPUS cohort, Italy, 2000-2011.

	Workers who participated at the last follow-up assessment (n=1983)				Workers lost to follow-up after an intermediate assessment[a] (n=1148)				Workers lost to follow-up after their baseline assessment[a] (n=1101)			
Characteristics at baseline	**N**	**%**	**Mean**	**SD**	**N**	**%**	**Mean**	**SD**	**N**	**%**	**Mean**	**SD**
Women	1495	75.4	·	·	537	46.8	·	·	791	71.8	·	·
Age (years)	·	·	38.3	9.1	·	·	37.2	10.0	·	·	36.9	10.1
BMI (kg/m^2)	·	·	23.8	3.9	·	·	24.3	4.0	·	·	23.3	3.8
Predisposing diseases[b]	173	8.7	·	·	81	7.1	·	·	87[c]	7.9	·	·
ACGIH TLV® categories												
– Below AL	1238	62.4	·	·	677	59.0	·	·	722	65.6	·	·
– Between AL and TLV	247	12.5	·	·	140	12.2	·	·	122	11.1	·	·
– Above TLV	498	25.1	·	·	331	28.8	·	·	257	23.3	·	·

Affected by CTS symptoms	328	16.5	·	·	123	10.7	·	·	149	13.5	·	·

Abbreviations: AL, action limit; BMI, body mass index; CTS, carpal tunnel syndrome; SD, standard deviation; TLV, threshold limit value.

[a]These groups also include retired workers.

[b]This group includes: diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus

[c]Missing information for two subjects.

Supplemental Table 4. Results from Multivariate Proportional Hazards Regression Models including exposure classified according to ACGIH TLV® method alongside selected covariates. Case definition restricted to subjects with classic/probable carpal tunnel syndrome symptoms. The OCTOPUS cohort, Italy, 2000-2011.

	CTS symptoms					**CTS confirmed by NCS**				
		Univariate analysis		**Multivariate model[a]**			**Univariate analysis**		**Multivariate model[a]**	
Characteristics	*Cases (n=371)*	*HR*	*95%CI*	*HR*	*95%CI*	*Cases (n=117)*	*HR*	*95%CI*	*HR*	*95%CI*
Sex										
Male	86	1.00	Ref.	1.00	Ref.	26	1.00	Ref.	1.00	Ref.
Female	285	2.62	1.60–4.30	2.31	1.78–2.98	91	2.54	1.53–4.21	2.31	1.51–3.51
Age (years)										
Up to 35	99	1.00	Ref.	1.00	Ref.	19	1.00	Ref.	1.00	Ref.
36–45	143	1.74	1.40–2.17	1.58	1.32–1.90	44	2.35	1.44–3.82	2.03	1.18–3.48
46–55	114	2.30	1.64–3.22	1.86	1.40–2.47	49	4.89	2.95–8.09	3.64	2.13–6.21
More than 55	15	4.12	1.84–9.21	3.14	1.79–5.50	5	8.13	3.83–17.3	5.50	3.90–7.75
P trend			<0.001		<0.001			<0.001		<0.001
Body mass index (kg/m^2)										
<25	228	1.00	Ref.	1.00	Ref.	53	1.00	Ref.	1.00	Ref.

25.0–29.9	108	1.34	1.07–1.67	1.41	1.15–1.73	44	2.35	1.51–3.66	2.29	1.42–3.69
30.0 or more	35	1.45	1.07–1.98	1.33	0.92–1.93	20	3.69	2.00–6.81	3.10	1.48–6.48
P trend			0.001		0.010			<0.001		<0.001
Predisposing diseases[b]										
None	322	1.00	Ref.	1.00	Ref.	98	1.00	Ref.	1.00	Ref.
At least one	49	2.52	2.09–3.04	1.66	1.26–2.20	19	3.08	1.59–5.98	1.51	0.82–2.78
ACGIH TLV® categories										
Below the AL	165	1.00	Ref.	1.00	Ref.	49	1.00	Ref.	1.00	Ref.
Between AL and TLV	94	2.36	1.47–3.81	2.14	1.95–2.35	33	2.30	1.11–4.78	1.94	1.37–2.75
Above TLV	112	1.90	1.10–3.28	1.83	1.40–2.40	35	1.95	1.03–3.70	1.84	1.32–2.56
P trend			0.005		<0.001			0.031		<0.001

Abbreviations: ACGIH, American Conference of Government Industrial Hygienists; AL, action limit; CTS, carpal tunnel syndrome; HR, hazard ratio; NCS, nerve conduction studies; TLV, threshold limit value; 95%CI, 95% confidence interval.

[a]Multivariate models included sex, age, body mass index, predisposing diseases and ACGIH categories.

[a]This group includes: diabetes, amyloidosis, gout, thyroid disorders, scleroderma, rheumatoid arthritis, systemic lupus erythematosus.

Supplemental Figure 1. Distribution of person-years by gender, hand activity level and normalized peak force. Figures refer to the analysis of CTS symptoms incidence. The OCTOPUS cohort, Italy, 2000-2011 (Circle sizes are proportional to the number of workers).

