

Application of Corlett & Bishop Method to determine possible CTDs in workers of donuts module in a bakery at Los Mochis, Sinaloa.

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Resumen. Dentro de la gastronomía mexicana, la panadería tiene un lugar muy importante. La mayoría de los panaderos de la vieja escuela de la panificación elaboran su producto de manera artesanal, por lo que sus herramientas también lo son. La mayoría de ellas, por no decir todas, no son ergonómicas, y las personas que las usan pueden verse afectadas en su salud, ya que la utilización de estas herramientas les puede ocasionar, sin saberlo, problemas de salud conocidos como Desordenes Traumáticos Acumulativos (DTA's). Objetivo. Determinar si se han desarrollado DTA's en trabajadores del módulo de donas, aplicando el método Corlett & Bishop. Delimitación. Este trabajo se limita al análisis de trabajadores del módulo de donas de una panadería de la ciudad de Los Mochis, Sinaloa, y las recomendaciones respectivas para evitar la aparición de nuevos DTA's. Metodología. En el módulo de donas laboran 8 trabajadores del sexo masculino, de los cuales 5 se encargan de la elaboración y 3 del freído de las mismas. Se aplica entre ellos un cuestionario en base al mapa de molestias de Corlett & Bishop. Cada trabajador menciona su malestar o dolor, según la zona del cuerpo en que lo siente. Se toma en cuenta su semana laboral, la cual

comprende del día domingo al día viernes. Resultados. En base a los resultados del cuestionario del método Corlett & Bishop, se determina que si existen DTA's en los trabajadores del módulo de donas de la panadería, ya que el resultado de dolor es mayor que el de molestia. Conclusiones. Tomando en cuenta los resultados obtenidos, se concluye que existen DTA's en los trabajadores del módulo de donas, por lo que se recomienda utilizar los resultados de esta investigación para evaluar, mediante el método de RULA, la situación y las condiciones de trabajo en las que operan dichos trabajadores, a fin de establecer una propuesta de mejora para estos obreros, ya sea modificando el método de trabajo o las herramientas que utilizan.

Palabras Clave: Herramientas no ergonómicas, Molestia, Dolor, Desordenes Traumáticos Acumulativos.

Abstract. Into Mexican Gastronomy, bakery takes a very important place. Most of the old fashion bakers make their products with craft methods, so their tools are crafts too. Most of those tools, if not all of them, are not ergonomic, and the people who use them can be affected in their health, because the utilization of those tools can cause , even if they don't know it, health problems known as Cumulative Trauma Disorders (CTD). Objective. Determine if Cumulative Trauma Disorders (CTDs) have been developed by donuts module workers, applying Corlett & Bishop Method. Delimitation. This research is limited to analyze the donuts module workers of a bakery at Los Mochis, Sinaloa, and the recommendations to avoid the appearance of new CTDs. Methodology. At the donuts module work 8 workers, male, which 5 are in charge of donuts elaboration, and 3 are in charge to fry the donuts. Corlett & Bishop questionnaire is applied to them. Every worker talks about the part of the body where he feels discomfort or pain. Workweek is taken in count, which includes Sunday thru Friday. Results. According to Corlett & Bishop method, is determined that exist CTDs in donuts module workers at the bakery, due to pain results are higher than discomfort results. Conclusions. Due to the obtained results, the conclusion is that exist CTDs in donuts module workers, so it is recommendable to use the results of this investigation to evaluate, using the RULA Method, the situation and the work conditions in which these workers are developing their activities, so it can be possible to establish a proposal to get better work conditions for these workers, modifying the work methods or the tools they use.

Keywords: Not ergonomic tools, Discomfort, Pain, Cumulative Trauma Disorders.

1. INTRODUCTION.

1.1 Actual situation.

Today, work is the main earnings source to have everything a person needs. As the time passes, human being look for the way to make work better, in order to get more and better benefits.

Some machines has been developed to help, automate and make faster production processes, generating bigger earnings to enterprises, all of this due to technology and the time and dedication that men have invest to adapt these machines to look for his own benefit.

This situation has as result the constant interaction of men with machines and work tools. However, human factor is the puzzle's main piece in a work center, and the reason why

it's necessary to take care of the way every person develops the activities. One way to do it is to look for the adaptation of the work place to the needs of the persons who work in it. At this point, ergonomics plays a very important roll, because it's based in the concept that laboral activity is not only the machine or the man, but the combination of both parts, so it's necessary to find the concordance between physical machine characteristics and psychophysiological man characteristics, defining it as "*the study of the human being in his work environment*" (Murell 1967).

The center of this investigation is the application of one of the ergonomics tools, the Corlett & Bishop Method, in the donuts elaboration line of a bakery. Thru the application of this method it's possible to determine if the workers of this line have been developing Cumulative Trauma Disorders.

Based in the ergonomics basic concepts and the idea that man is the main study object of ergonomics, it's very important to know and understand the work risks present at work.

The bakery under study is located at the city of Los Mochis, Sinaloa, and his main activity is the elaboration and sale of bread in different varieties. At the donuts module work 8 persons, male, which 5 are in charge of donuts elaboration, and 3 are in charge to fry the donuts.

Physical and mental effects caused by this work to those workers bring a number of diseases and fatigue symptoms that can cause CTDs, decreasing their performance and affecting their health, so it's necessary to know their actual situation about the symptoms they can actually have. It's important to mention that there are very few investigations about similar environment work.

2. OBJECTIVES.

2.1 Particular.

Determine if Cumulative Trauma Disorders (CTDs) have been developed by donuts module workers of a bakery in the city of Los Mochis, Sin., applying the Corlett & Bishop Method.

2.2 Specifics.

2.2.1 Apply the Corlett & Bishop questionnaire to the workers of the bakery.

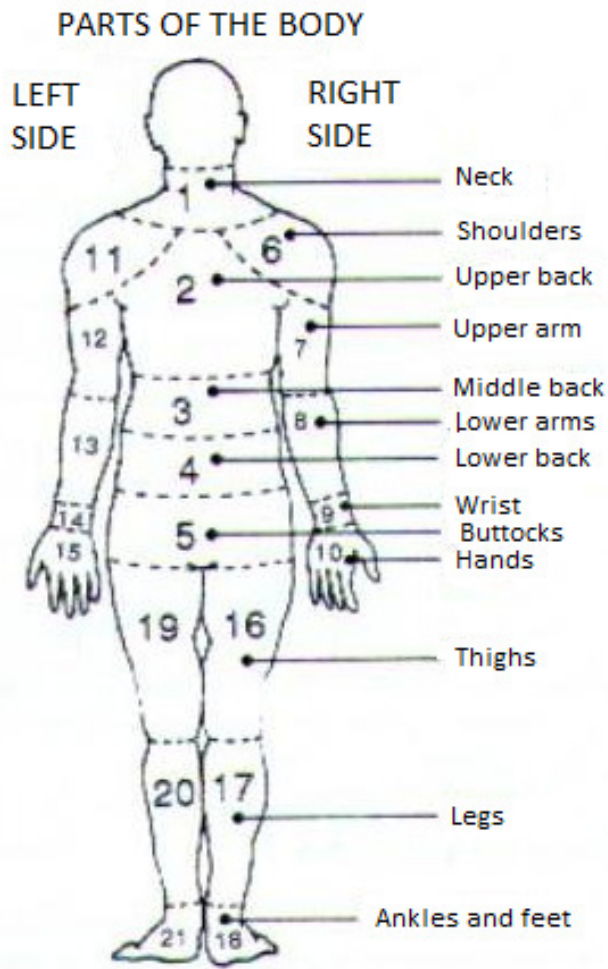
2.2.2 Analyze the obtained results.

2.2.3 If there are CTDs, make an improvement proposal to avoid new CTDs in the workers in the future.

3. METHODOLOGY.

First thing is to apply Corlett & Bishop questionnaire shown in Figure 1 to the workers at the bakery.

Write in the table the correspondent letter depending if you feel: D = Discomfort, P = Pain



Part of the body	Time of registry		D	L	M	M	J	V
Head	Beginning workday							
	Ending workday							
Neck	Beginning workday							
	Ending workday							
Shoulders	Beginning workday							
	Ending workday							
Upper back	Beginning workday							
	Ending workday							
Upper arms	Beginning workday							
	Ending workday							
Lower arms	Beginning workday							
	Ending workday							
Middle back	Beginning workday							
	Ending workday							
Lower back	Beginning workday							
	Ending workday							
Wrist-hand	Beginning workday							
	Ending workday							
Buttocks	Beginning workday							
	Ending workday							
Thighs	Beginning workday							
	Ending workday							
Knees	Beginning workday							
	Ending workday							
Legs	Beginning workday							
	Ending workday							
Ankles	Beginning workday							
	Ending workday							
Feet	Beginning workday							
	Ending workday							

Figure 1.- Discomfort Map and Corlett & Bishop Method questionnaire.

In this questionnaire, the workers answered depending of the symptom they felt the day and the time they were interviewed. Table 1 shows as example the answers of one of these workers.

Table 1.- Worker's answers example.

Part of the body	Time of registry		D	L	M	M	J	V
Head	Beginning workday							
	Ending workday							
Neck	Beginning workday							
	Ending workday							
Shoulders	Beginning workday							
	Ending workday							
Upper back	Beginning workday							
	Ending workday		D	D	P	P		
Upper arms	Beginning workday							
	Ending workday					P		
Lower arms	Beginning workday							
	Ending workday							
Middle back	Beginning workday			D		D		
	Ending workday						P	P
Lower back	Beginning workday		D					D
	Ending workday			D		P	P	
Wrist-hand	Beginning workday						D	
	Ending workday							
Buttocks	Beginning workday							
	Ending workday							
Thighs	Beginning workday							
	Ending workday							
Knees	Beginning workday							
	Ending workday							
Legs	Beginning workday							
	Ending workday							
Ankles	Beginning workday							
	Ending workday							
Feet	Beginning workday							
	Ending workday							

As can be seen in Table 1, the questions are made at the beginning of the workday, about 6:00 in the morning, and at the end of the workday, between 2:00 and 3:00 afternoon. Is just then when every worker mentions about his discomfort or pain, depending the part of the body where he feels it. The whole workweek is taken into account, which begins on Sunday and finish on Friday.

4. RESULTS.

Table 2 shows the total results of the Corlett & Bishop questionnaire application to the bakery workers during 3 weeks. In this table can be seen that the highest results were obtained at donuts module, in both discomfort and pain, reason why this module is analyzed carefully to determine if CTDs are being developed by workers or, still worst, they already have CTDs.

Table 2. Total results for the Corlett & Bishop questionnaire application.

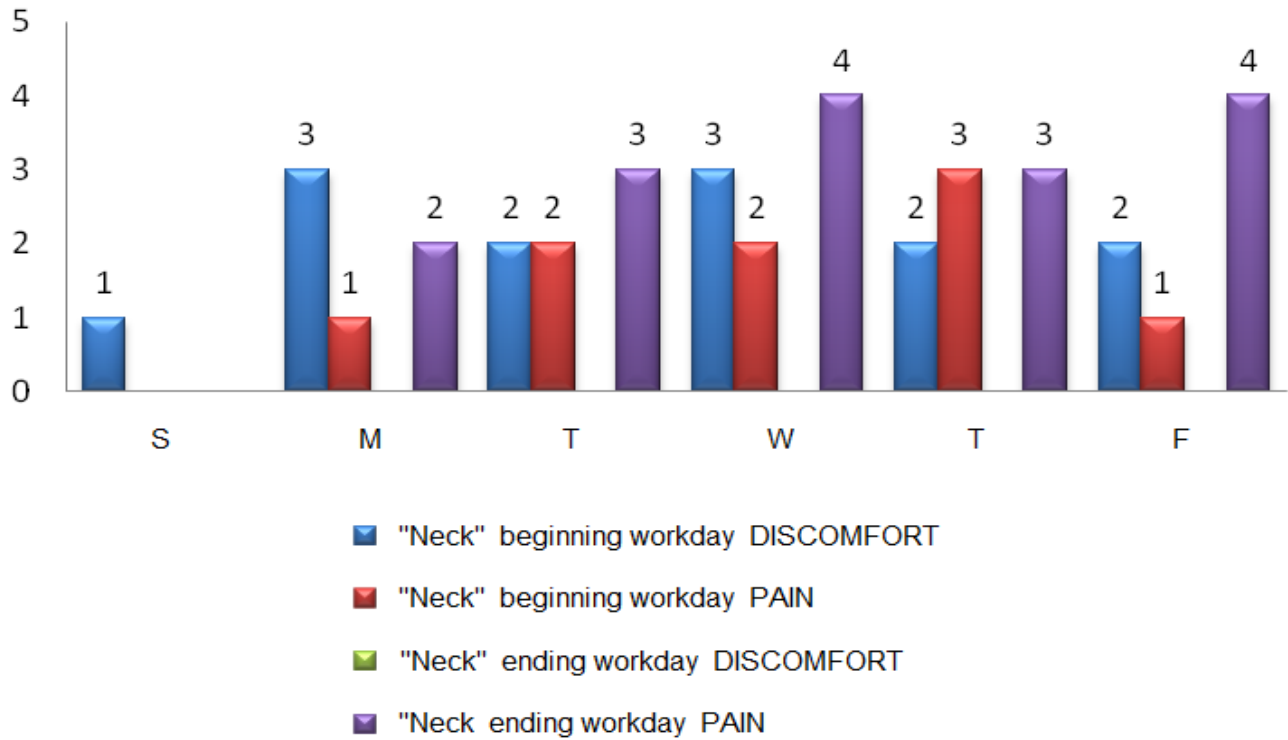
MODULE	PAIN	DISCOMFORT
Almohadita	87	122
Arreglado	72	86
Batidos	90	96
White bread	123	125
Conchitas / Minisemita	53	72
Corico	66	79
Donuts / fry	194	189
Package	63	87
Packing	78	89
Ovens	127	134
Pastry	114	127
Tortillas	68	78
Varieties	84	95

Detailed results at donuts module are shown in the Table 3.

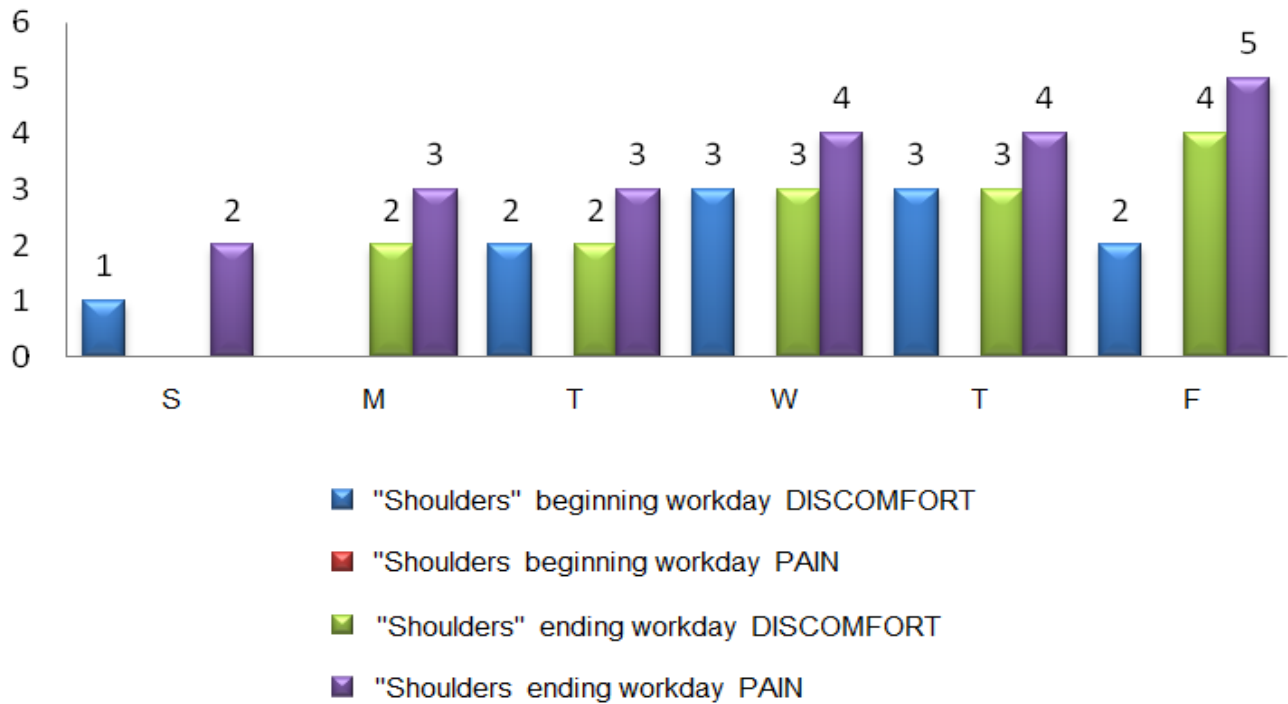
Table 3. Corlett & Bishop questionnaire results (donuts module).

Part of the body	Time of registry	D	L	M	M	J	V
Head	Beginning workday						
	Ending workday		2	1	2	2	1
Neck	Beginning workday	1	3	2	3	2	2
	Ending workday	1	2	2	2	3	1
Shoulders	Beginning workday	1		2	3	3	2
	Ending workday		2	3	4	3	4
Upper back	Beginning workday		2	3			2
	Ending workday	1	1	2	3	2	1
Upper arms	Beginning workday	2	1	3		3	2
	Ending workday		2	3	3	4	2
Lower arms	Beginning workday		2	3	3		
	Ending workday		3	4	5	5	4
Middle back	Beginning workday		1	1	3	2	
	Ending workday		1	1		2	2
Lower back	Beginning workday	1	3	3	2	4	3
	Ending workday	2	2	4	3	3	2
Wrist-hand	Beginning workday	1	4	5	3	4	4
	Ending workday	1	3	2	2	2	2
Buttocks	Beginning workday	1	5	5	4	5	4
	Ending workday						
Thighs	Beginning workday						
	Ending workday						
Knees	Beginning workday						
	Ending workday						
Legs	Beginning workday	1	2	1	1	3	
	Ending workday	1	3	4	3	5	4
Ankles	Beginning workday	1	2	3	2	2	
	Ending workday	2	4	4	5	5	4
Feet	Beginning workday						
	Ending workday						

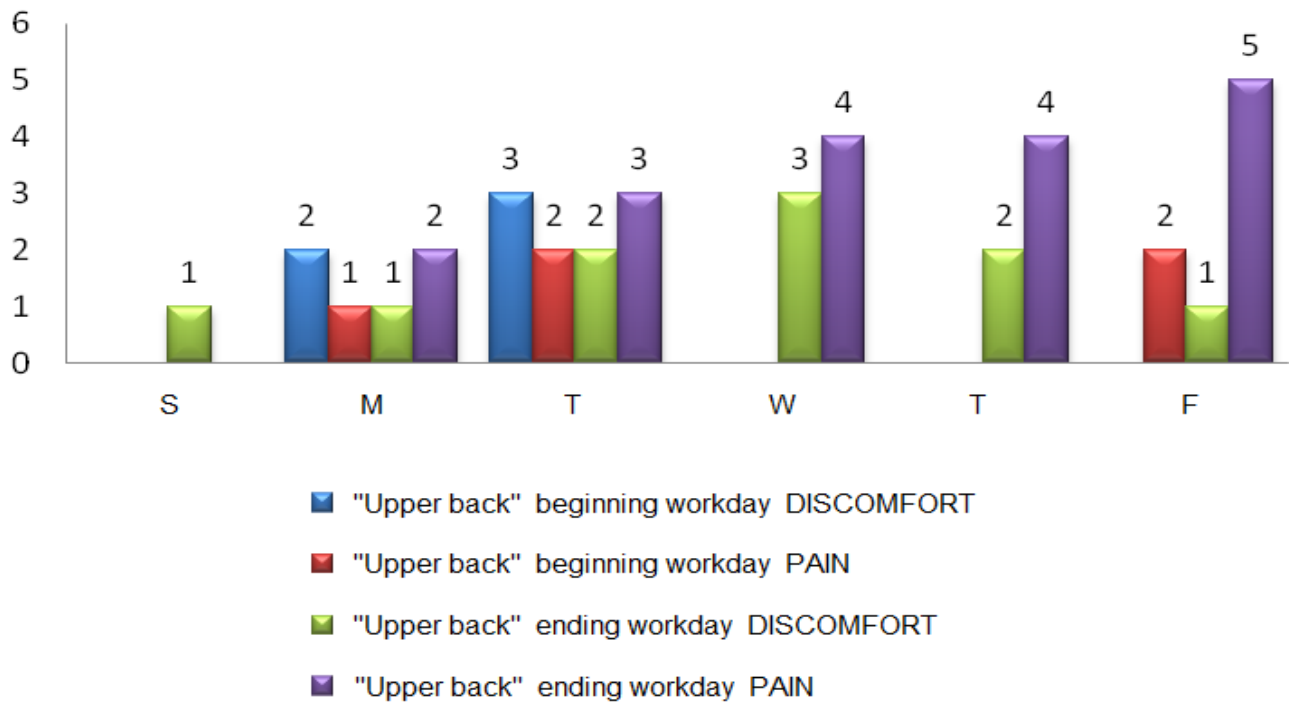
Graphics 1 to 9 show the obtained results of the Corlett & Bishop questionnaire application according to the Table 3.



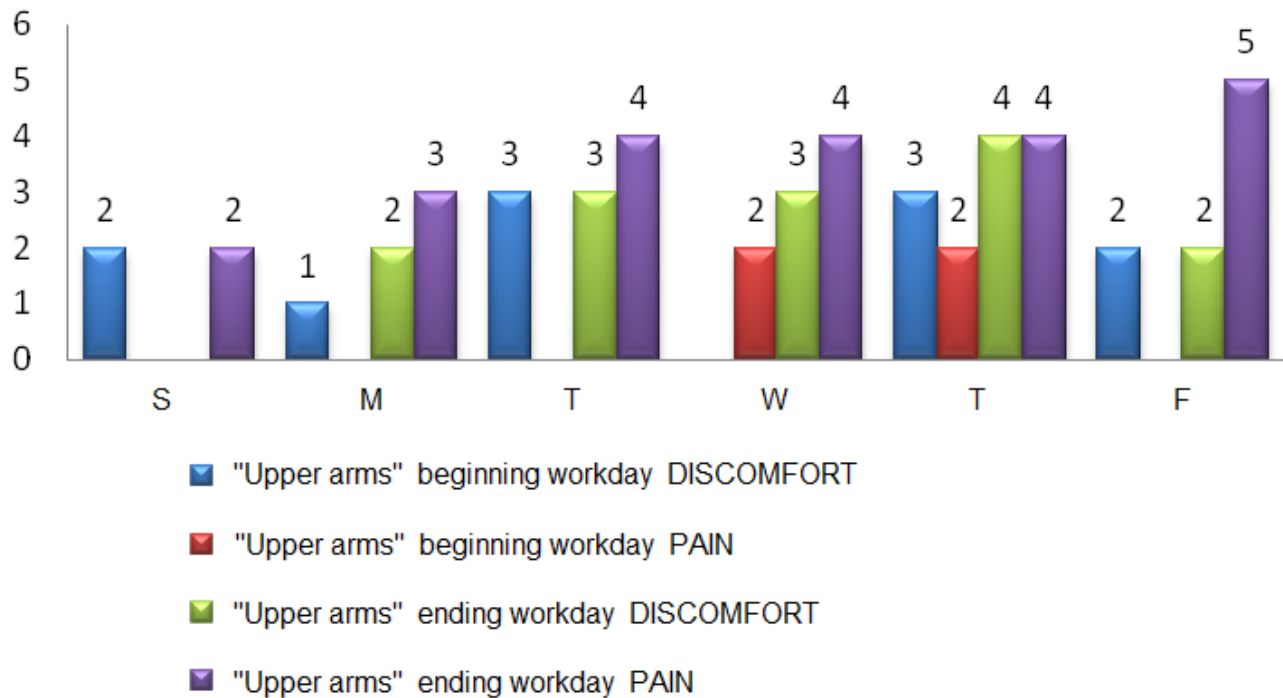
Graphic 1. Corlett & Bishop results, "Neck"



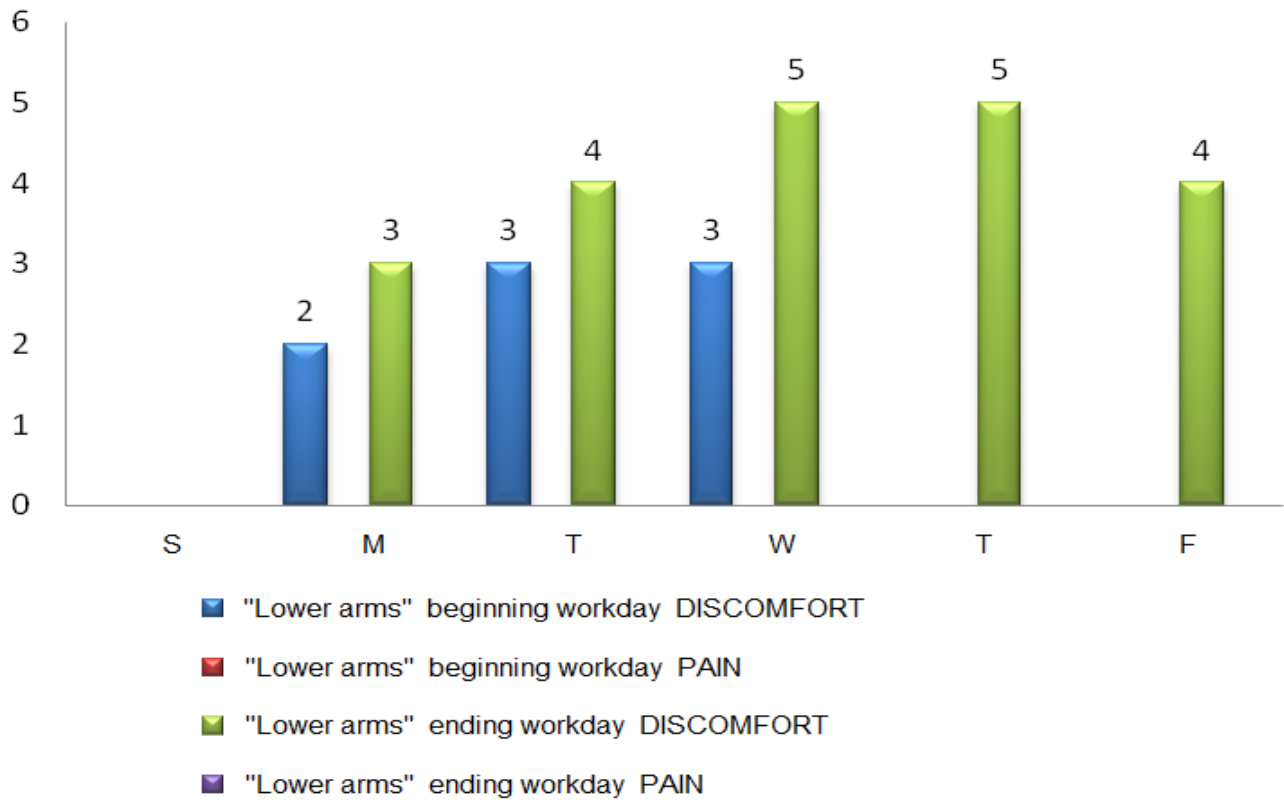
Graphic 2. Corlett & Bishop results, "Shoulders"



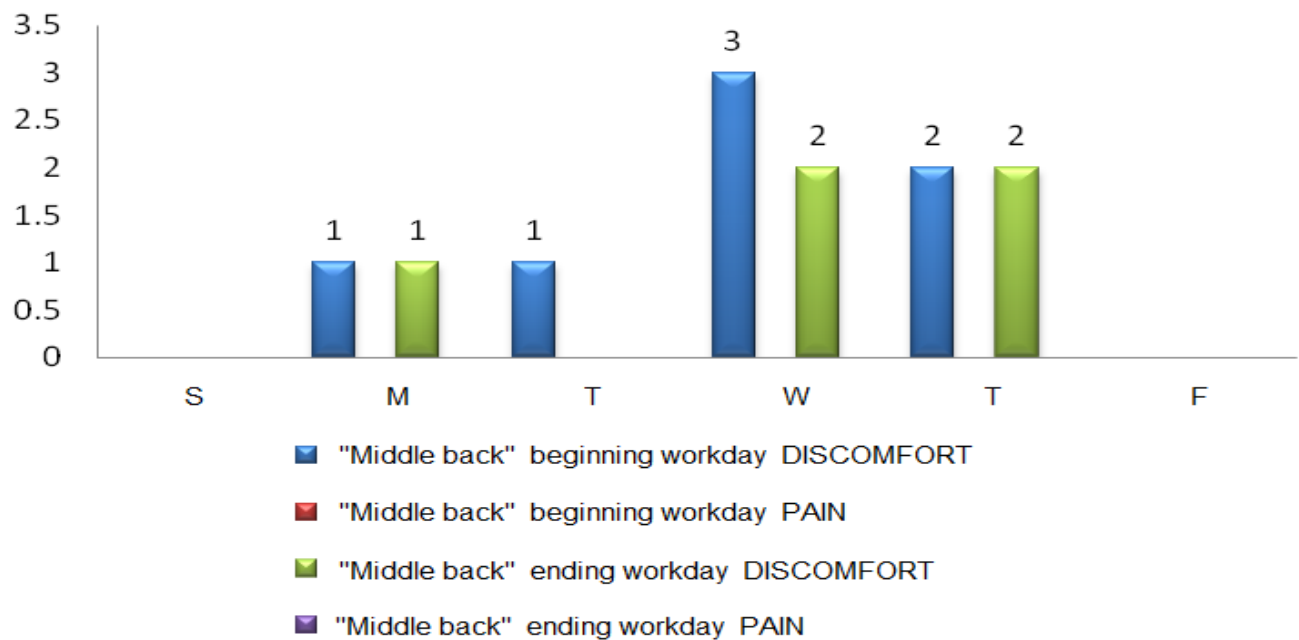
Graphic 3. Corlett & Bishop results, "Upper back"



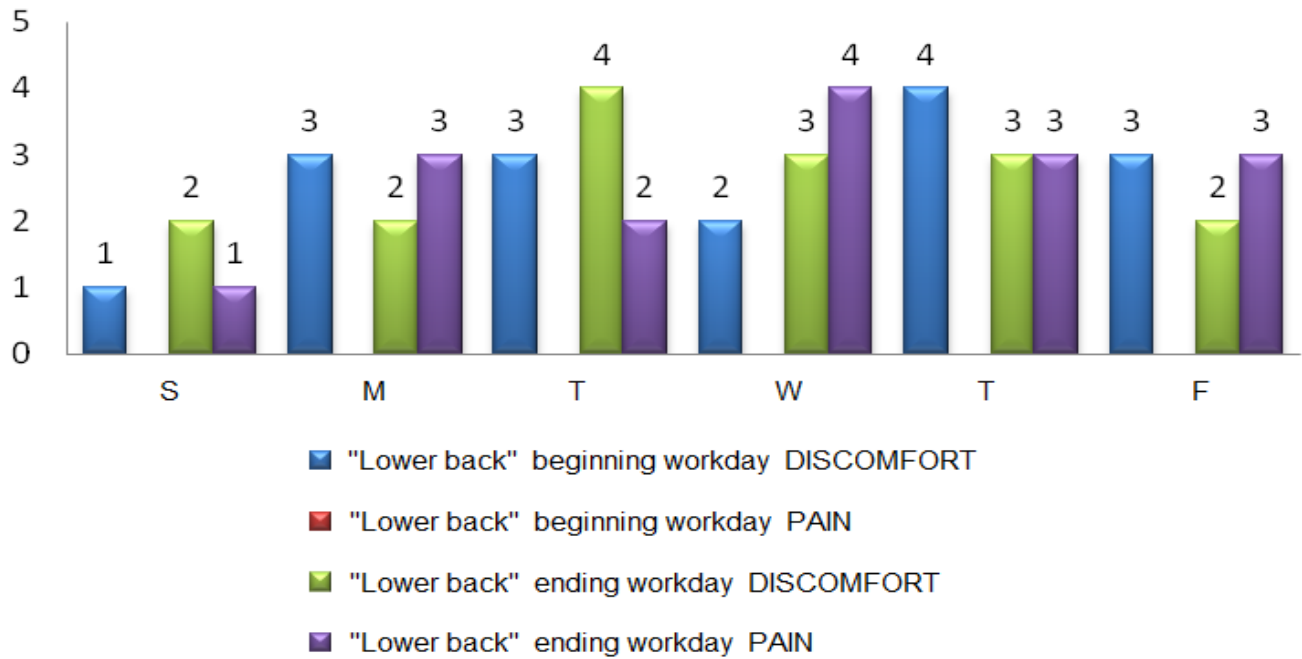
Graphic 4. Corlett & Bishop results, "Upper arms"



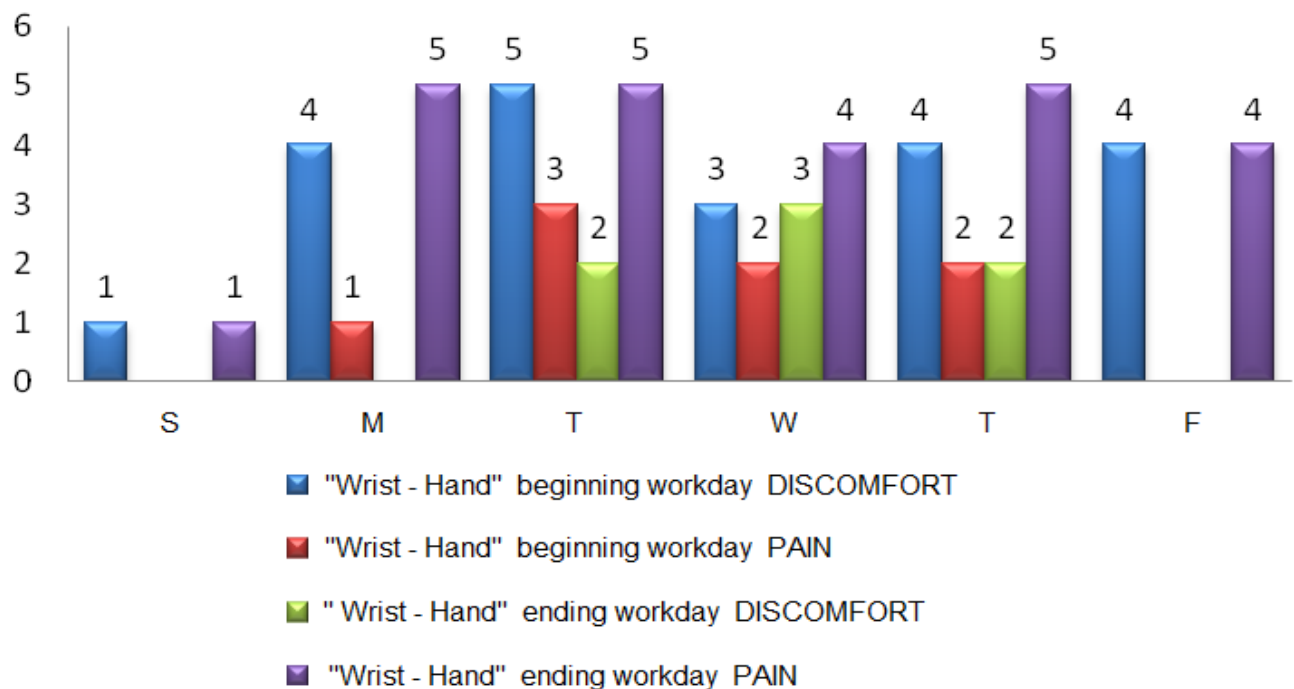
Graphic 5. Corlett & Bishop results, "Lower arms"



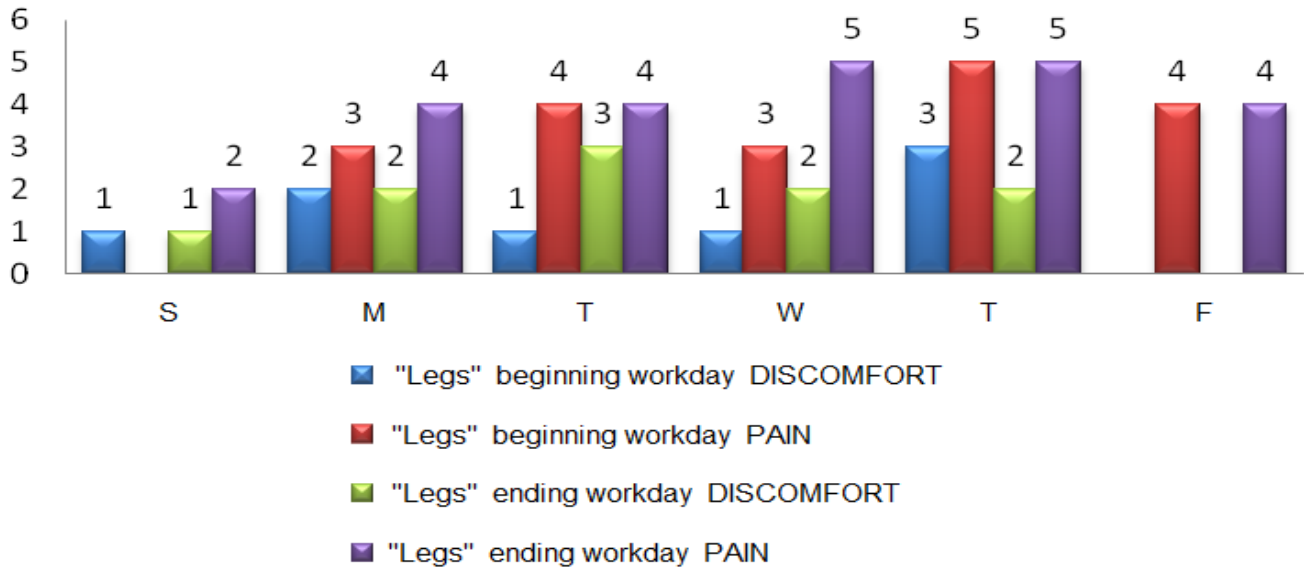
Graphic 6. Corlett & Bishop results, "Middle back"



Graphic 7. Corlett & Bishop results, "Lower back"



Graphic 8. Corlett & Bishop results, "Hand"



Graphic 9. Corlett & Bishop results, "Legs"

5. CONCLUSIONS.

Based on the obtained results, it's possible to determine that exist CTDs in donuts module workers, due to the pain results are bigger than discomfort results (194 – 189 respectively), as can be seen in the Table 2 of total results for the Corlett & Bishop questionnaire application. It's recommended to use these results to evaluate the situation and the work conditions of this workers using the RULA Method, to establish an improvement proposal to modify the work methods or the work tools or both.

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