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16 minutes, 50
seconds

EDUCATION

How Stuff Works: The Wrist Wrap

TAGS: elbow injury, wrist injury, wrist hypermobility, wrist instability, wrist stability, how stuff works, Marilia Coutinho, wrist wraps, shoulder injury



“They're quite lovely, even if they smell bad” (anonymous survey respondent)

Introduction: How We Think Stuff Works and How Stuff Really Works (or Doesn't)

In this second article about personal training/lifting equipment, I have even more questions and fewer answers than on the one about belts. In my technical literature review, I found one article. To my great disappointment, it was one I wrote 13 years ago.

The reasons are the same I explained for the scarcity of research on the belt (which is abundant in comparison to the wrist wrap): “science push and market pull”. There is not enough of either.

Athletic wrist wraps are very popular and wrist orthoses (orthopedic devices used to prevent movement of joints during treatment, prevent joint injury or align joints) even more. Just like orthopedic low back belt-like devices are no help to understand how an athletic lifting belt works, wrist orthoses, about which there is more research, are of little use in our case.

Not all is darkness, though: 262 athletes gave their input in an interesting survey about their use of wrist wraps.

Basics About the Wrist Wrap

Summary chart:

Health X Performance	H+
Precursors	ND
Quality/quantity of research	EL
Competitive only, training only, both	CT
Diversity of manufacturers	ON
Price range	2-150 (with a few much more expensive exceptions, all orthoses)

Parameters	Output
Health X Performance	H+ = primarily health related, injury prevention P+ = primarily performance HP = both
Precursors	ND = A precursor can't be dated, possibly ancient CN = Last century DT = dated precursor
Quality/quantity of research	EL = extremely low (less than 50 peer-reviewed articles all time) VL = very low (between 51 and 200 peer-reviewed articles all time) LW = low (between 201-2000 peer-reviewed articles all time) SR = some research (over 2001 peer-reviewed articles all-time)
Competitive only, training only, both	CO = competitive equipment only TE = training equipment only CT = used in competition and training
Diversity of manufacturers	US = usual suspects: niche manufacturers ON = out of niche, medical equipment manufacturers, too many to count
Price range	In US dollars

What Does a Wrist Wrap Look Like

Wrist wraps are made from different materials and with different lengths, from simple slings to complex devices combining glove parts, thumb sleeves, and grip aid elements. Some are made of an elastic material that restricts wrist bending without totally immobilizing the joint, plus any other desired effect such as aiding in grip, restricting thumb or whole hand movement. Only powerlifting federations have strict rules concerning them. If you don't compete in powerlifting, the options to choose from are close to infinite since they include whatever you can improvise or create.

This is part of my original collection:



I owned, tested and used over 50 wrist wraps of different brands, models and lengths. Like everyone, I finally settled for three: one softer, for Olympic Weightlifting training and lighter powerlifts and two tougher, for heavier bench presses.

Personal equipment choice is strictly individual. There are several decent brands in the market, but what will help the lifter is determined by a unique combination of variables. For example: I have benign joint hypermobility, inherited from my father and passed on to my daughter. People with hypermobility frequently also have injury-prone joints and instability in weight-bearing joints. Wrist wraps and their proper use is essential for me. There is no study about this but apparently, I am an exception among high-performance benchers and the percentage of us with hypermobility is probably different from the percentage in the general population (personal communication from experienced coaches and lifters).



Atlanta, 2011, an international powerlifting competition: the wrist wrap wrapping moment is usually part of the athlete's focus ritual. This is a regular stretching sling wrap with Velcro adjustment. This is the longest allowed wrap in powerlifting (36 inches).



Same competition, lockout position on the bench press.

Other types of modern wrist wraps:

Leather wrist wraps:



From "Full Grain Leather"

Chinese and Russian non-stretch products:



From Strengthshop.de



From MA Strength

Most sports don't have much on the way of wrist wrap specification even when their players usually wear some type of wrist protection in competition, like in tennis. Their rulebook doesn't restrict the athlete's options.



Marin Čilić



Sloane Stephens

In combat sports, wrist protection is critical but most rulebooks contain specifications only for gloves and design, including sponsors logos: see UFC promotional guidelines and World Boxing Council rules and regulations.

Wrist wrapping procedures are sophisticated and require a high level of expertise:

There are several athletic wrist protection products in the market. Some combine wrist protection and a bar grip device, which will be the subject of another article. Many of the orthoses available may be suitable for lifters and may be permitted by their competitive federation.

Competition Wrist Wraps Specifications

Olympic Weightlifting

According to the International Weightlifting Federation:

"4.5.1 Bandages are non-adhesive wraps made of a variety of materials; most common materials are gauze, medical crepe, neoprene/rubber or leather.

4.5.1.1 There is no limit to the length of the bandages.

4.5.1.3 Bandages may be worn both on the inner and outer surface of the hands and may be attached to the wrist."

In Olympic Weightlifting competitions, several different types of wraps are used. Some international elite-level athletes prefer non-elastic materials including cloth and leather.

Here are some examples:

Gold medalist Shi Zhiyong, Athens 2004, using what appears to be a leather two-buckle wrist support, similar to those seen in USPTO patents from the early XXth century:



Credit: News Guangdong 08/17/2004

2018 University World Champion Maude Charron using non-stretch cotton wraps:



Credit: Hookgrip, March 10, 2019

Raattanawong Wamalun at the 2018 World Championship wearing a bandage that covers a long extension of her forearm:



Credit: Hookgrip, November 28, 2018

Personal communication from Olympic weightlifting athletes suggests that they also use “powerlifting style” wrist wraps, with a preference for shorter and more flexible wraps.

Powerlifting

According to the International Powerlifting Federation:

Wraps

Only wraps of one ply commercially woven elastic that is covered with polyester, cotton or a combination of both of those materials or medical crepe are permitted.

Supportive wraps:

Only wraps from commercial manufacturers officially registered and approved by the Technical Committee shall be permitted for use in powerlifting competitions.

Non supportive wraps:

Wraps made of medical crepe or bandage and sweatbands do not require Technical Committee approval.

Wrists

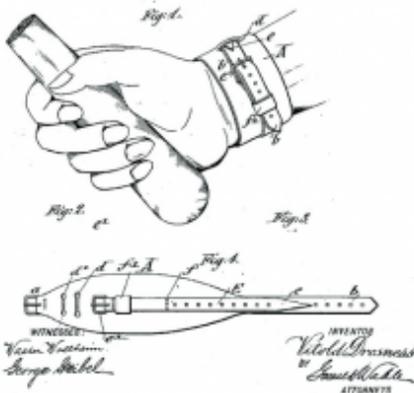
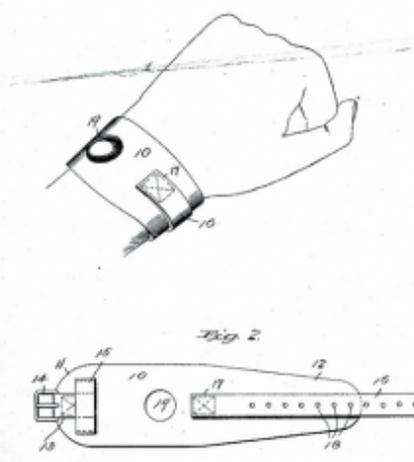
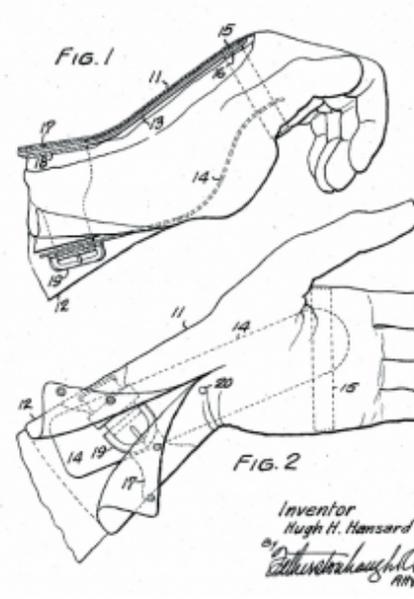
1. Wrists wraps shall not exceed 1 m in length and 8 cm in width. Any sleeves and Velcro patches/tabs for securing must be incorporated within the one meter length. A loop may be attached as an aid to securing. The loop shall not be over the thumb or fingers during the actual lift.
2. Standard commercial sweat bands may be worn, not exceeding 12 cm in width. A combination of wrist wraps and sweat bands is not allowed.
3. A wrist covering shall not extend beyond 10 cm above and 2 cm below the center of the wrist joint and shall not exceed a covering width of 12 cm.

Here are some models carried by elitefts.

The Strongman Corporation doesn't provide technical specifications for wrist wraps allowed in competition.

Precursors and Technological Innovation Pathways

The precursors of modern wrist wraps as well as wrist orthoses are probably early work injury protection devices. The earliest documents we have are USPTO patents that date back to the beginning of the XXth century.

Date	Patent number	Illustration
1901	US Patent 680477	 <p>The illustration for US Patent 680477 consists of two figures. Figure 1 shows a hand holding a cylindrical object, with a wrist wrap around the wrist. Figure 2 is a detailed view of the wrist wrap, showing its length and various components. The drawing is signed by the inventor, Victor F. Adams, and the attorney, Joseph H. Kibel.</p>
1908	US Patent no. 923217	 <p>The illustration for US Patent no. 923217 consists of two figures. Figure 1 shows a hand with a wrist wrap around the wrist. Figure 2 is a detailed view of the wrist wrap, showing its length and various components. The drawing is signed by the inventor, Victor F. Adams, and the attorney, Joseph H. Kibel.</p>
1923	US Patent no. 1469315	 <p>The illustration for US Patent no. 1469315 consists of two figures. Figure 1 shows a hand with a wrist wrap around the wrist. Figure 2 is a detailed view of the wrist wrap, showing its length and various components. The drawing is signed by the inventor, Hugh H. Hansard, and the attorney, Arthur H. Hansard.</p>

From then on, the two routes took independent paths.

The State of the Art

Patents are technical documents that must list references just like a scientific peer-reviewed article. They are not scientific articles but rather legal documents. Detailed referencing of the state of the art in patents is made to support the legal claims made in the filed patent.

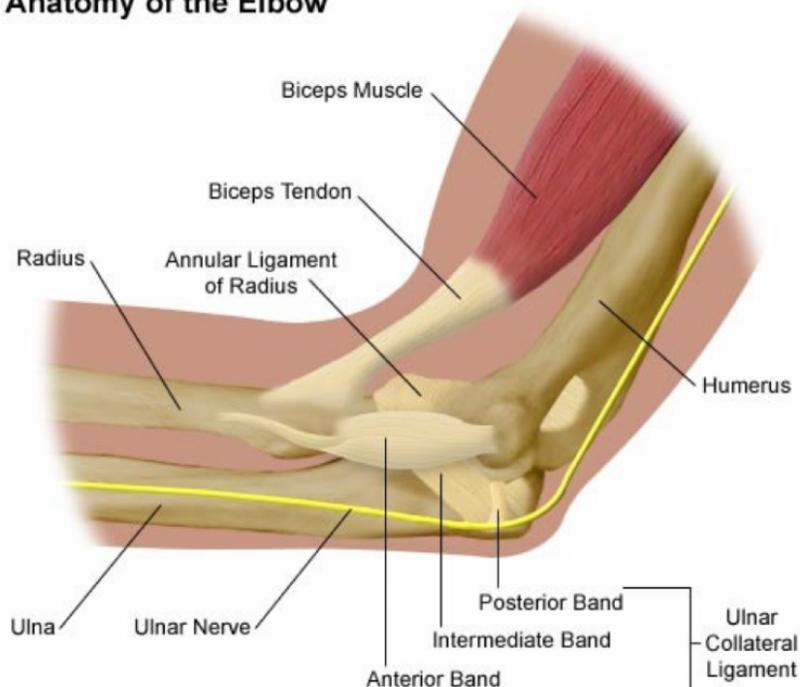
Relevant scientific information to understand wrist wraps is related to two topics: wrist, elbow and shoulder injuries and joint hypermobility.

Shoulder, Elbow and Wrist Injuries: The Role of Wrist Extension

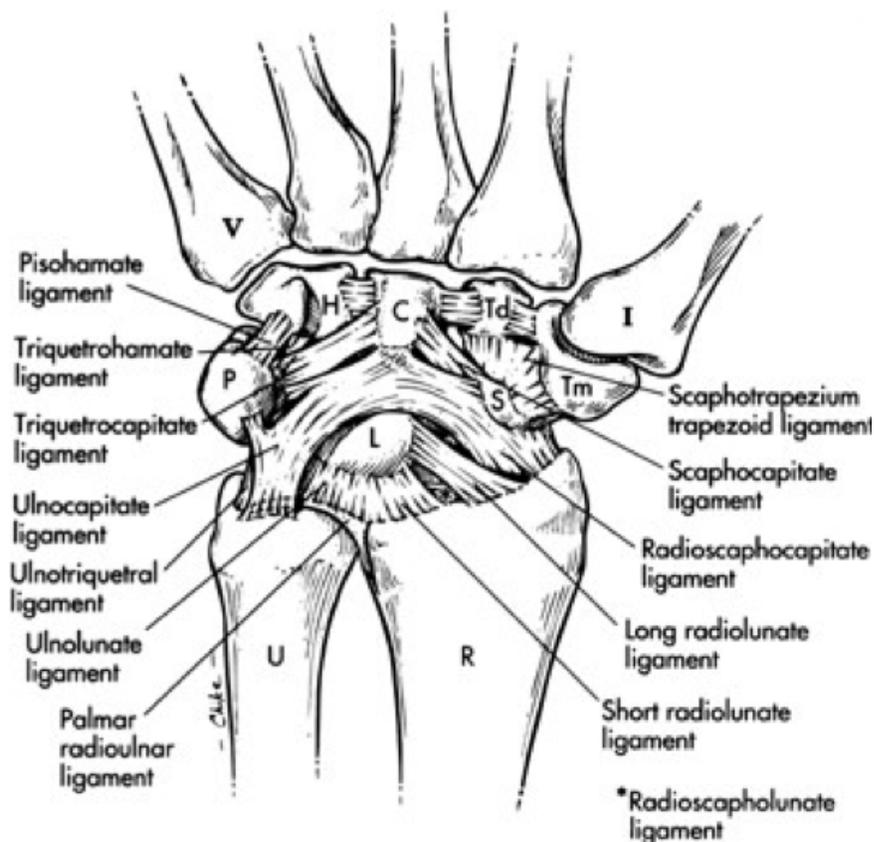
Wrist wraps were developed as protective devices for strenuous work involving arms and. In sports in general, wrist wraps protect the athlete from elbow and wrist injuries by restricting forced or voluntary backward and sideways wrist movement.

Upper body injuries are common in sports, involving the shoulder, the elbow, and the wrists. Two classes of injury may be distinguished: overuse (chronic) injuries and acute injuries. Elbow overuse injuries include musculotendinous injuries, ulnar nerve injuries and ligamentous injuries (Rettig 1998).

Anatomy of the Elbow



From: Yale-New Haven Hospital Health Library



From: University of Pennsylvania Health Systems – Penn Orthopaedics

In a 2005 study carried out by the Institute of Sport and Recreation Research at New Zealand (Keogh et al 2006), 36% of all reported injuries in powerlifting involved the shoulder and 11% involved the elbow. Wrists were not included in the questionnaire. Later studies reported similar findings (Strömbäck et al 2018). Many elbow injuries, though, are a later consequence of wrist overuse or trauma. Field and Savoie (1998) reported that lateral epicondylitis occurs among 50% of athletes that use overhead arm motions. In spite of being an elbow injury, the onset of lateral epicondylitis begins with the excessive use of the wrist extensor musculature. Most elbow injuries are chronic, overuse injuries (Safran 2004).

Restriction of wrist backward, forward and sideways bending may contribute to preventing such wrist originated injuries. The wrist wrap effectively serves this purpose.

Bellow is a table of common elbow injuries for different sports, according to Frostick et al (1999). Weight training, in general, is associated with ulnar nerve disorders.

<i>Sport</i>	<i>Common injury</i>
Racquet sports	Lateral epicondylitis with backhand
Golf	Medial epicondylitis on downswing with trailing arm
Basketball	Lateral epicondylitis with leading arm
Water-skiing	Posterior compartment with follow through on jump shot
Bowling	Valgus extension overload of the posterior compartment with trick skiing
Baseball	Flexor-pronator soreness
Volleyball	Valgus stress of pitching: medial traction, lateral compression, posterior abutment
Football	Valgus stress at impact of striking
Gymnastics	Valgus stress with throwing a pass; hyperextension and dislocation and olecranon bursitis with direct trauma
Weight training	Radiocapitellar overload and posterior impingement with weight bearing on extended elbow
Field events	Ulnar collateral ligament sprain, ulnar nerve irritation
Shot-put	Posterior impingement with follow through
Javelin	Valgus-extension overload of throwing: medial traction, posterior abutment, lateral compression
Canoeing, kayaking	Distal bicipital tendinitis
Archery	Extensor muscle fatigue, lateral epicondylitis of bow arm
Rock climbing	Brachialis or distal bicipital tendinitis

From: Frostick, S.P., Mohammad, M. and Ritchie, D.A. 1999. "Sport injuries of the elbow". J. Sports Med. 33:301-311, p. 301.

In their review, Frostick et al (1999) present several versions for the onset of ulnar nerve injuries. Elbow flexion reduces cubital tunnel area and may, therefore, contribute to the entrapment syndrome if inflammation and repetitive stress are also present. Chronic elbow instability seems to be frequently associated with ulnar nerve injuries. Both conditions are present at bench press training and competition. Apparently, wrist wraps not only restrict wrist flexion but also help to stabilize the elbow during flexion.

Wrist Instability and Hypermobility

Only a licensed health professional can properly diagnose you with joint hypermobility. You can check some simple tests [here](#) and [here](#) (Mc Kean et al 2014).

Hypermobility or joint laxity may or may not be associated with pathological symptoms (Ercolani et al 2008). If you are a lifter or even a regular strength training practitioner, it is unlikely that you have pathological hypermobility syndrome.

Studies contrast Generalized Joint Hypermobility (GJH) with Joint Hypermobility Syndrome (JHS). GJH is fairly common among healthy individuals and more prevalent among females. A recent study showed that the prevalence of GJH was 26.2% overall (females 36.7 %, males 13.7 %). Prevalence of JHS was 19.5 % overall (females 24.5 %, males 13.7 %). Injury rates were not significantly different for individuals who had GJH vs. those who did not have GJH (Russek et al 2016).

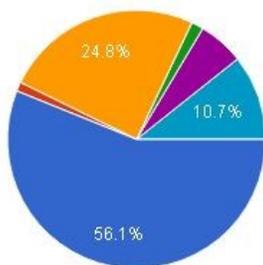
Hypermobility syndrome is poorly understood and still controversial. In the wrist, is a form of carpal instability (wrist instability) not necessarily associated with any injury (Carlsen and Shin 2008). The genetic basis of hypermobility and joint instability remains largely unknown (Ercolani et al 2008, Malfait et al 2006).

People with joint hypermobility and wrist instability can have a harder time keeping wrist alignment during lifts such as the bench press, the snatch or the clean and jerk. I have joint hypermobility and although I have won several bench press world championships and broken world records, placing 6th all time in my weight class in 2015, I have never been able to avoid excessive wrist extension during the bench press and I need my wrist wraps from warm-up weight up. Not using them causes extreme instability and pain. This is what a heavy bench press looks like for me:



How Do Athletes Use the Wrist Wrap: The Survey

I created a short survey for athletes and strength training practitioners in order to understand their use of the wrist wrap. The survey received 262 responses. Athletes from 5 different sports responded, as well as strength training practitioners not competing in any sport:

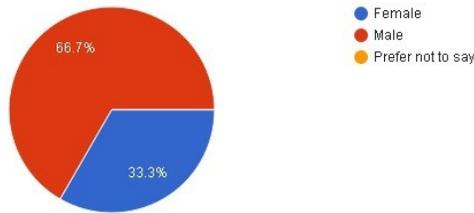


- Powerlifter
- Olympic weightlifter
- Strongman
- Crossfitter
- Bodybuilder
- Not sport specific strength training practitioner

Most respondents were male, concentrated in their late twenties, although athletes in their late thirties, early forties and even older were well represented:

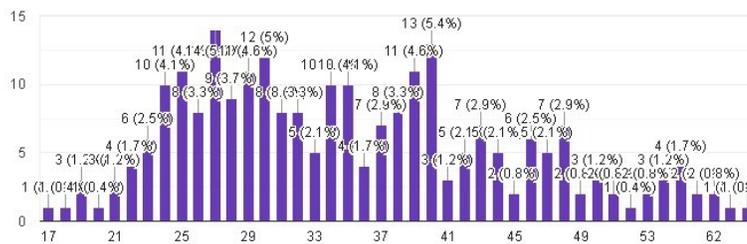
What is your sex?

261 responses



What is your age?

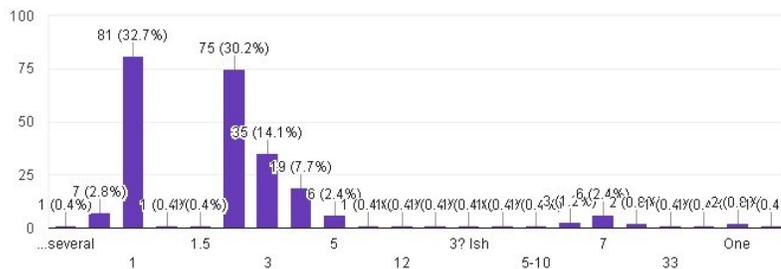
241 responses



Most people who own wrist wraps have more than one pair:

How many pairs?

248 responses

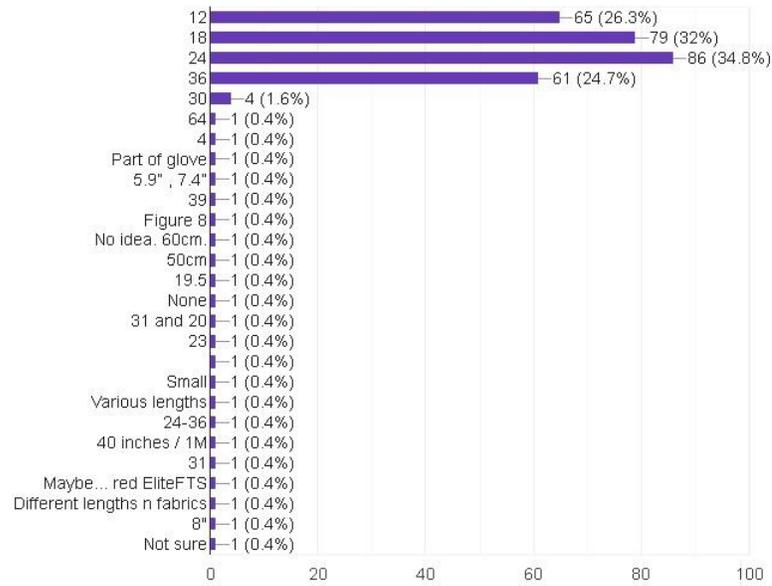


That makes sense considering what was mentioned before: this type of equipment is very individual and the athlete may feel different wraps are optimal for different situations.

The preferred length of the wrist wraps they own is useful information for those looking into buying their first pair. A 12-inch wrist wrap is usually too short to provide any support and a 36 inch takes forever to wrap:

How long are they (in inches)?

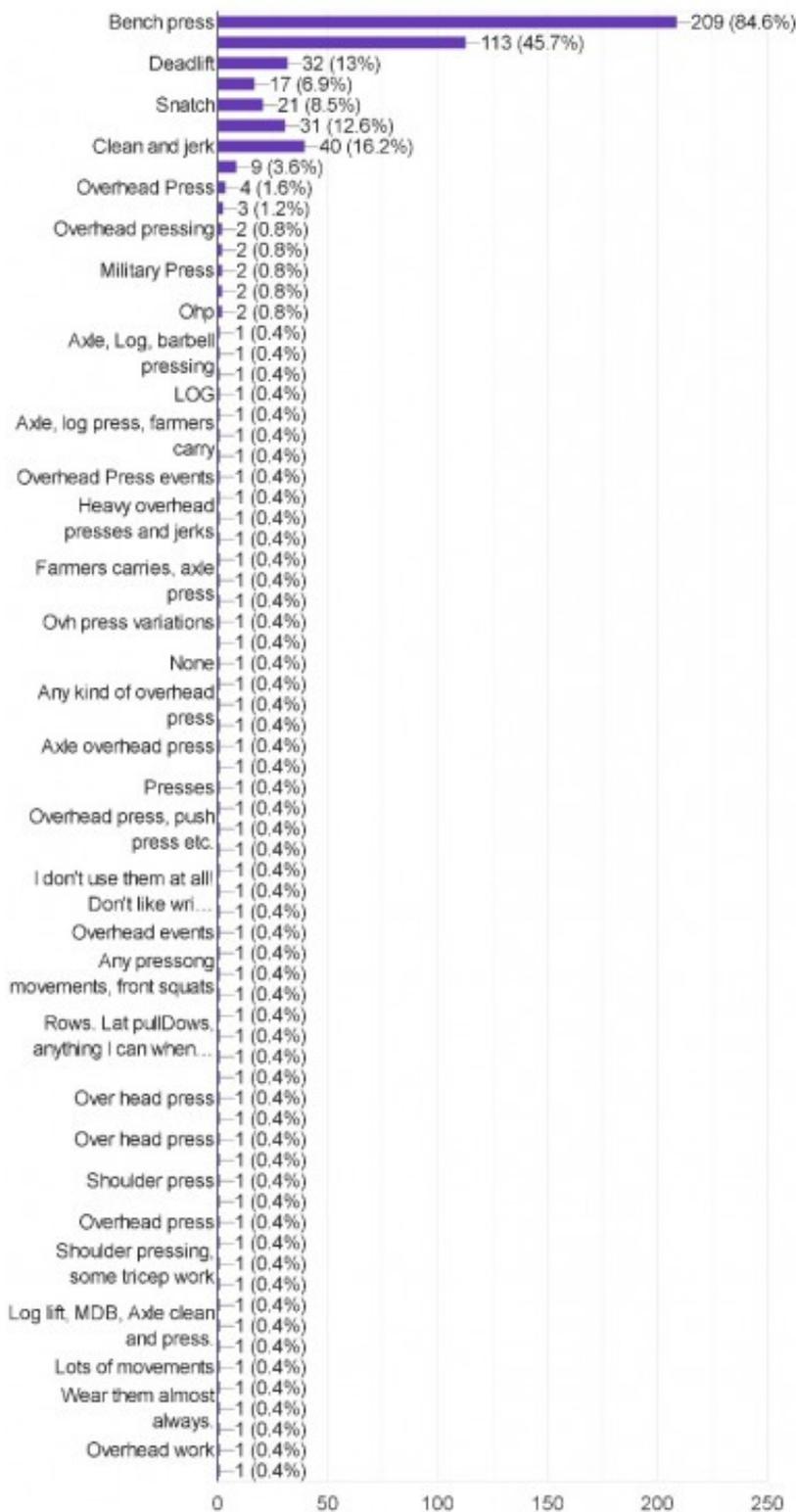
247 responses



Most respondents were powerlifters, and in that sport, the bench press is the lift where wrist stability is most challenged. The response below reflects that:

In which lifts/exercises do you use them?

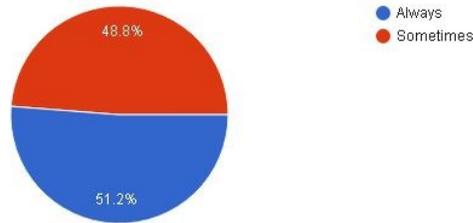
247 responses



The question concerning when the wrist wrap is used must be put into context: the first answer refers to a training session (every training session as opposed to just some training sessions). The second answer concerns lifting intensity:

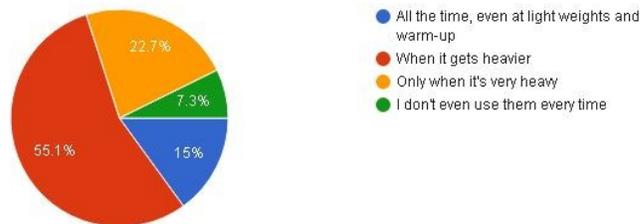
Do you use them:

244 responses



Do you use them:

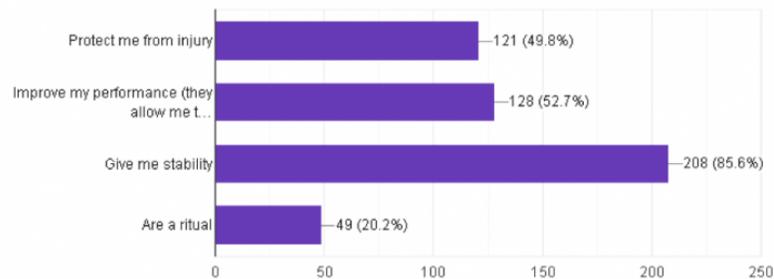
247 responses



The majority of respondents feel that the wrist wraps provide stability although approximately half of them also perceive them as performance equipment:

Do you feel the wrist wraps:

243 responses



Can the Systematic Use of a Wrist Wrap Cause Muscle Weakness?

There is no evidence that this can happen. What may happen is poor development of your perception concerning stability. If you use a tight and tough wrist wrap at all times, you won't identify what is the threshold load for your control and stability. If you have hypermobility and it creates severe instability, the threshold will be a low weight and you will want to use a wrist wrap even during warm up. That is not common for the majority of people and even less, the majority of high-performance benchers.

Not using a wrist wrap on light weights because of a misconception (or because some "bro" thinks it's tougher not to use protective equipment) can and probably will make you vulnerable to injury.

Psychological Benefit and Ritual

About 20% of the respondents associated the use of wrist wraps to a ritual aspect of their lifting.

Takeaways

Good idea	Bad idea
Train wrist stability through wrist extensor strength exercises and upward holding stability exercises.	Fail to train forearm strength and stability.
Observe, through your own subjective perception, by video and third-party input, how stable your wrists are at increasing holding loads.	Just use a super tough and tight wrist wrap at all times.
If possible, get a diagnosis about your wrist mobility and stability. If you have hypermobility, don't wait to get injured: use a wrist wrap whenever you feel unstable, even if it is a light weight.	Ignore your shaking wrists at higher weights and act tough.
If you are a competitive powerlifter, politely ask people if you can examine (and test) their wrist wraps. Try to examine the widest variety of wraps and compare their material, their toughness, their elasticity, and their feel, in general. Choose wisely.	Just use the cheapest wrap or the one that you are sponsored for. Your sponsor should have more than one model for you to choose from. If not, he doesn't have your best interest in mind.
If you are not a competitive powerlifter, test anything and everything you can. Choose what feels best: flexible, if you need flexibility; stable if you need stability and comfort.	Choose what looks cute or markets the most in your tribe. That's really the worst thing you can do.
If you feel it gives you confidence and mental preparedness, by all means, keep them and use them exactly as you feel comfortable with.	Give up using wrist wraps because someone convinces you that it's just a placebo or a crutch. They haven't diagnosed you (what if you have inherited hypermobility?) and ritual effect doesn't mean weakness.

Bottom line: "know thyself".

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How Stuff Works: The Belt



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