

## DIY Strap Guide

This guide is not a 123 step-by-step guide to making straps. Rather, it is intended to be a comprehensive resource for people who are looking to design and construct straps that fit their needs (literally) for various cases used for DIY SlimeVR trackers. Sections of the guide will go over the following areas:

- Materials most commonly used to construct straps
- Tools for assembling the materials together
- Designing and measuring the parts to fit your body
- Attaching the straps to various cases used by SlimeVR community members (3D printed or otherwise)

For further help including questions unanswered by this guide, please join the SlimeVR discord ([SlimeVR](#)) and ask your question in the appropriate channels.

*Thanks to ZRock35, dqmageduwu, and NWB for proofreading the guide.*



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# Materials

There are a plethora of materials that can be used to make straps for SlimeVR. The limit is simply how creative you are in using them.

It is functionally impossible for this guide to cover all known materials, thus this will focus on the most common of materials seen in the SlimeVR community.

## Elastic Straps / Sewing Elastic



Elastic is the core component of any strap setup. While rigid webbing straps (such as the type seen on backpacks and dufflebags) can also be used, these are not usually recommended. Muscles change shape during movement, as a result rigid webbing straps may tend to slide over time. Elastic, however, can accommodate for this and is less prone to sliding.

While it is entirely possible to sew non-adjustable straps, similar to an elastic bracelet, it is recommended to include a means of adjusting the tightness of the band for comfort and easier removal.

Sewing elastic comes in many widths and colours. While smaller widths are commonly available even in large department stores such as Wal-Mart, wider widths more suited for SlimeVR will be typically found either in local sewing/fabric supply stores or online. The total length that you will need for all your straps will depend on your body, but generally 5 - 6 metres (15 - 20 feet) will give you enough to make a set with enough left over if you make a mistake and need to add more.

Sewing elastic is typically found in three primary types; braided, knitted and woven. Each type varies in their construction which affects how they stretch.

## Braided Elastic



Braided elastic has lines/ridges along the entire length of the elastic. When stretched it will narrow in the middle of the strap, causing more tension unevenly across the strap. This type is usable but not ideal for straps.

## Knitted Elastic



Knitted elastic has the most uniform, plain fabric-like appearance. When stretched this type will maintain a more uniform width across the entire length. Additionally, the knit of this elastic has a softer feel on skin. These qualities make this type suitable for straps.

## Woven Elastic



Woven elastic has a blocky, pattern-like appearance. It is the firmest of these types, and does not stretch particularly well. The lack of stretch along with its relative hardness make this type **not recommended** for straps.

For most SlimeVR cases, elastic with widths between 1 ½ to 2 inches (3.8 to 5 cm) will be ideal, though you are free to go thinner or wider as your needs require. Note however that thinner elastic will not provide as stable of a surface for your trackers which can result in more wobble during movement.

Variations of elastic exist with a silicone rubber backing, improving grip on bare skin. This type is more commonly found online, and at a higher price premium relative to regular elastic, so availability will vary depending on your region. Common search terms on Amazon and Aliexpress include “non slip elastic” and “silicone elastic”



Another version known as ELA1500 or boxer elastic exists, this type is typically used in men's boxer underwear, and is very well suited for SlimeVR straps. However, it is not commonly available outside of specialised retailers, so obtaining it is more difficult. An example of this elastic can be seen in Smeltie's strap showcase.



Pre-bought commercial straps can also be used, but are more limited in their sizing and availability due to being intended for other products. Asking for help on the SlimeVR Discord is your best bet regarding these products.



## Velcro®

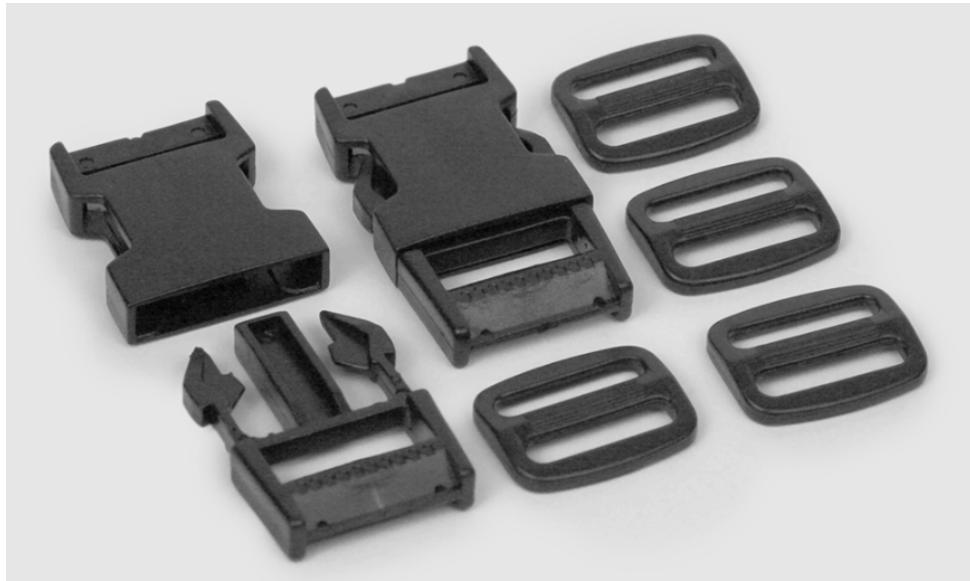


Velcro (generically known as Hook and Loop Fastener) is the most common method of providing adjustability to DIY straps. It provides a fairly solid connection, is easily sewable to elastic, and is commonly available in the same widths as elastic. It is however prone to losing its ability to connect over longer periods of time and use.

If you cannot find velcro that matches the width of your elastic closely, two smaller widths of velcro can be cut and sewn side by side to compensate for missing width.

Special versions of the loop portion of velcro infused with elastic exist. This version is found on the JoyCon leg band from Ring Fit Adventure. Known under the brand names Velcro® VELSTRETCH® or DuraGrip®, these otherwise suitable products are very expensive, making this not a cost efficient method of making straps outside of obtaining it very cheaply somehow.

## Detachable Buckles



While sewing elastic and velcro is the most accessible and arguably the most comfortable method of making straps, those who find sewing difficult to understand or physically demanding may use buckles to reduce the amount of sewing needed.

Available in both plastic and metal, buckles provide a very strong, long lasting, and easily detachable means of making straps adjustable. The main disadvantages come from a higher cost-per-piece vs velcro's cost-per-length, not being as commonly available in most local stores, and physical size relative to the strap pressing into the skin and causing discomfort.



*An example of tracker straps using buckles. Image from MightyGood in the SlimeVR Discord.*

## Double Sided Mounting Tape / Peel and Stick Velcro (OPTIONAL)



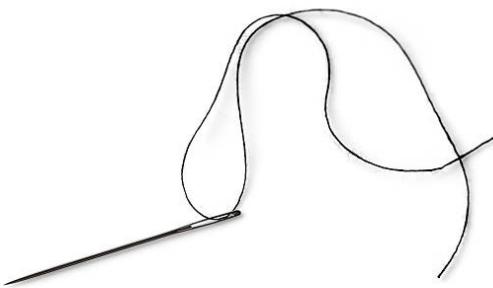
Double sided mounting tape is not required as most 3D printed SliimeVR cases are designed with strap mounts as part of the case. However, for those who do not have a 3D printed case, double sided mounting tape can be used to fix small pieces of velcro to the underside of plastic jewellery boxes, cardboard, or electrical tape used by some more enterprising members of the community to allow a velcro-based means of attaching the trackers to the straps. Alternatively, peel and stick velcro can be used.



An example of using sticky velcro on the left and mounting tape on the right.

# Tools

## Sewing Needle and Thread



The cheapest and most available tool for DIY straps, the process of stitching is relatively straightforward to learn. Stitching however is very labour intensive and time consuming, especially if you are learning for the first time. Explanations of simple and effective stitches are available further down in the guide.

## Sewing Machine



Sewing machines make the task of sewing significantly faster. For those who already own and are familiar with them, using them makes your stitches substantially stronger. If you do not own one or are unable to borrow one, it is not advisable to buy a machine just for the sole purpose of sewing straps due to the higher initial cost and learning curve.

## Scissors



You will be doing plenty of cutting. Comfortable scissors large enough to cut your wide elastic are recommended.

## Seam Ripper



A seam ripper is designed to slip into stitches and cut the thread, allowing you to undo your mistakes. These can be found at low cost, and are considered a necessity for any amount of sewing.

## 3D Printer (optional)



3D printers are usually reserved for printing cases. However, with sufficient 3D modelling skill, you can design and print your own quick release strap connectors. This is a very advanced way to do this, but there is nothing stopping you from doing so. An example of this can be found in the designing section of the guide.

## Hot Glue Gun (**NOT RECOMMENDED**)



Hot glue has been used by DIY Slime makers as a way to secure the various electronic components into their cases. Some however have used hot glue to attach the case itself to the strap instead of velcro and sewing. This is **not recommended** because regular hot glue isn't that strong.

## Stapler (**NOT RECOMMENDED**)

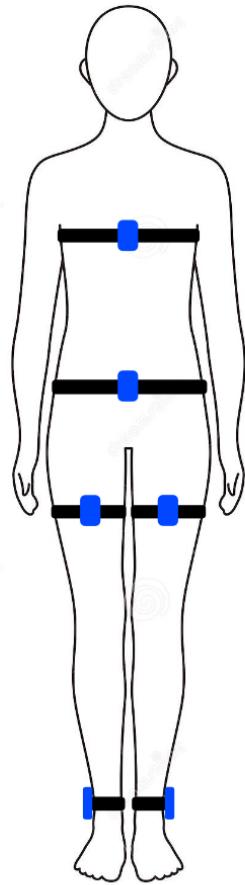


These have been used by some DIYers as a very rudimentary means to make straps. Staples are **not recommended** for this. Staples are meant to hold sheets of paper and other similar materials together. They are not designed to hold elastic that is under tension. You will save yourself future trouble by just using a needle and thread.

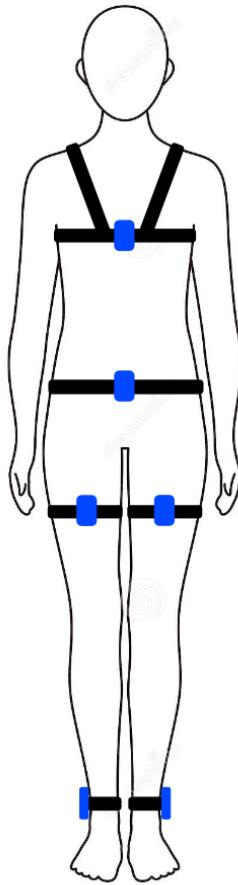
# Strap Layout

The community has created a wide variety of strap designs, the majority of which can be simplified into two variants. These illustrations are showing a simplified 6 tracker setup (Chest, hip, upper and lower legs). Additional straps for other trackers are made in the same way, only differing in sizing.

Simple Straps



With Chest Harness

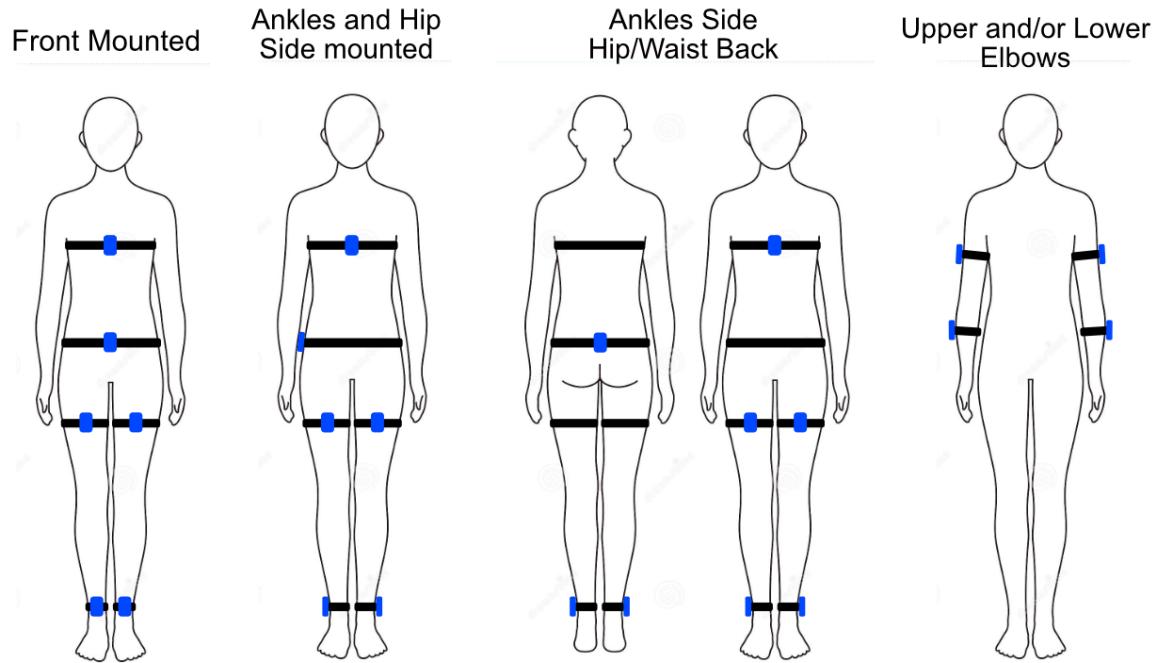


The left design is a simpler design to make, utilising only single loops for all the straps. It however poses a stability problem for the chest tracker, causing it to shake more. Many people report needing to pull the strap back up on the chest frequently, particularly after heavy movement such as dancing.

The right design is more complex, but provides a significant improvement to chest tracker stability and comfort. A similar commercial design can be found as GoPro chest mounts, making this design well suited for heavy movement.

## Mounting

Where you wear your straps for tracker mounting is largely up to what you feel is comfortable and accurate. Here are some of the places that community members have chosen to put their trackers.



For further help with mounting and calibration, please check out the calibration website made by Erimel (<https://louka3000.github.io/SlimeVR-Calibration/>) and join the SlimeVR discord for further questions.

## For 3D Printed Cases

The majority of community designed 3D printed cases come with strap mounting points, greatly simplifying the mounting process. The strap is simply slid through the existing holes , providing excellent stability. The default designs have 40mm (1.57 inches) wide slots for straps, though builders with 3D modelling experience can modify these as they need.



*The Hyperion case designed by Smeltie. The strap mount is the bottom line of the case.*

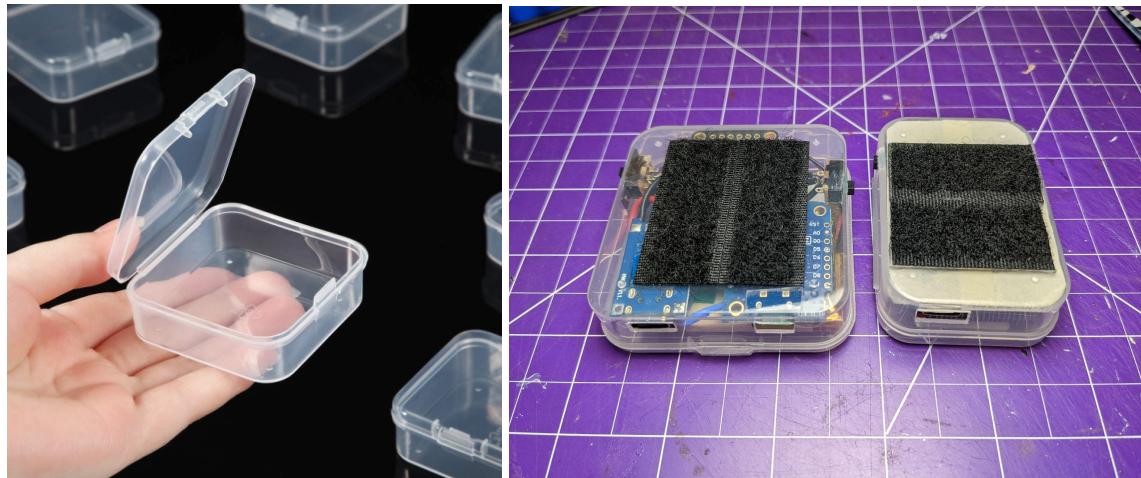


*How the Hyperion fits onto straps. Image from Aze on the SlimeVR Discord.*

A full list of 3D cases can be found in the Community-built Cases section of the Docs.

## For Homemade Cases

Repurposed items used as cases require additional work to mount to your straps. A simple method (as outlined in the materials section) is attaching sticky velcro or mountain tape to velcro.



*An example of small jewellery boxes being used as slime trackers with velcro attached to the bottom.*

This solution requires a corresponding piece of velcro on the strap itself in order to mount it.



*An example of a chest tracker strap with corresponding velcro attachment point.*

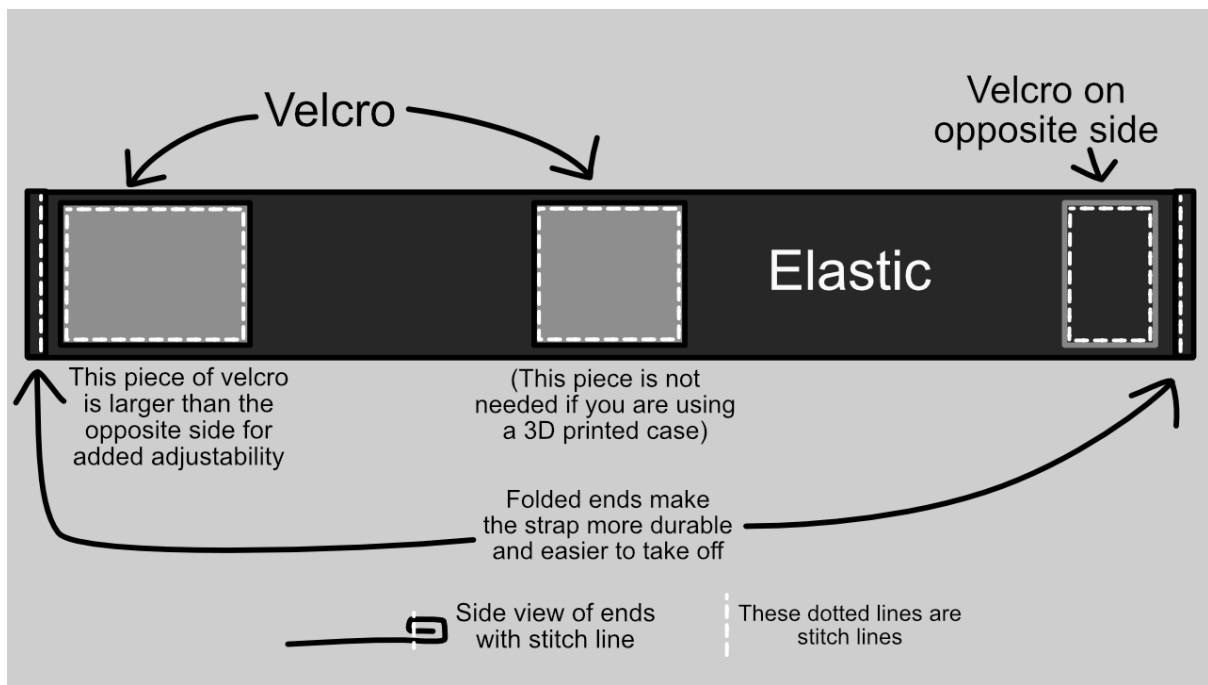
# Designing and Making the Straps

This section does not provide a step by step guide to making your straps. These designs were created with simplicity of construction in mind, sacrificing comfort, stability, and ease of use. You are free to follow them, use them as reference, or disregard them entirely and create your own design.

For further questions, please go to the SlimeVR discord and ask in the appropriate channels there.

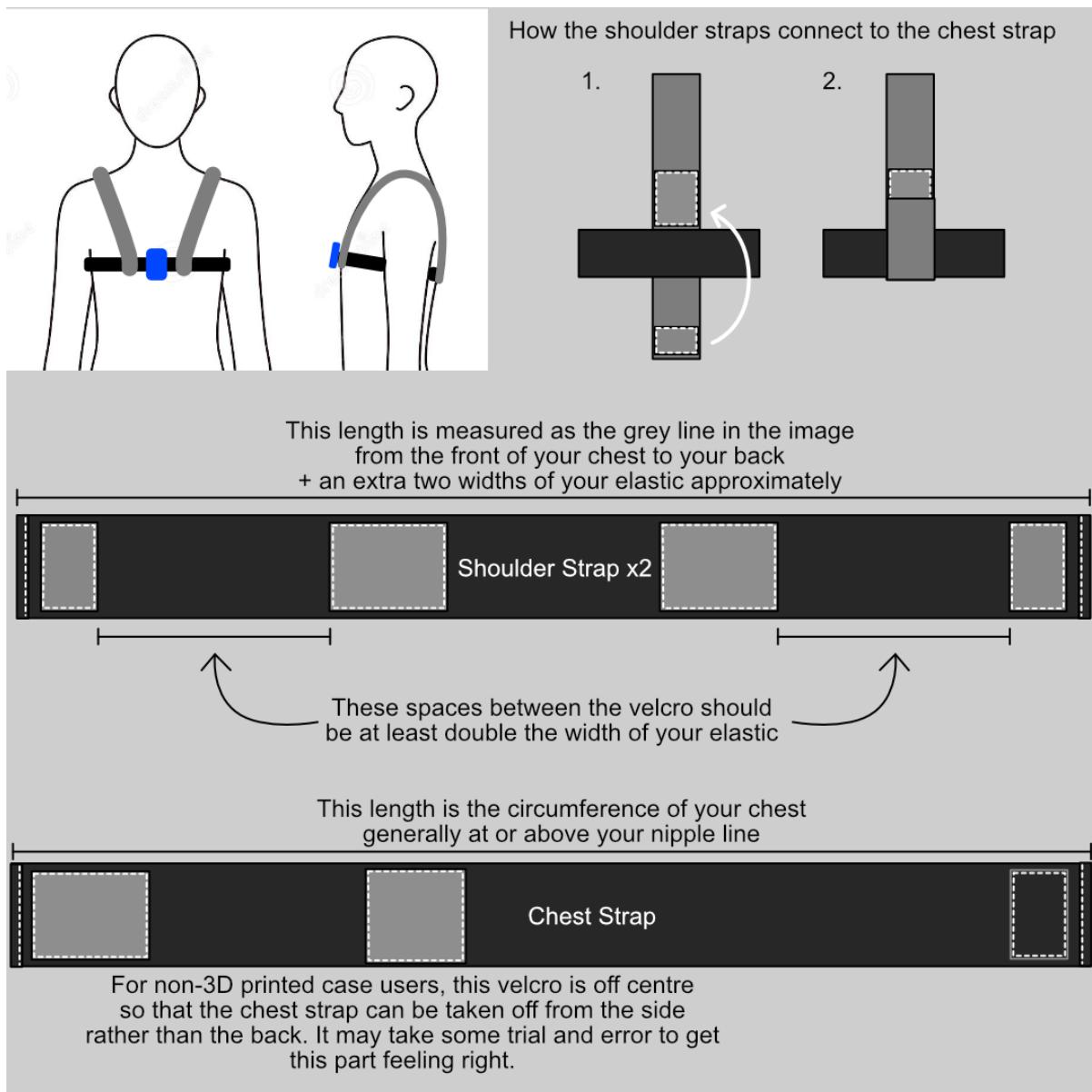
## Simple Loop Straps

Most of your straps are simple loops around various parts of your body. The basic diagram looks like this. The total length of each strap depends on the body part.



You are not required to fold the ends of the elastic. However, the ends of cut elastic will quickly fray and come apart if not taken care of. An alternative method to folding the ends would be to sew an overlock stitch over the cut ends. The technique can be found further down.

# DIY 4 Point Chest Harness



This is a simplified chest harness design meant to provide additional stability without having to commit to permanently stitching the shoulder strap to the chest strap. There are flaws with this design that can be worked around, but the goal of this design is to be as straightforward as possible. As with the simple loop strap, you are free to modify (and I encourage it) this design to suit your needs.

## Commercial GoPro Chest Mounts



*The AmazonBasics GoPro chest harness*



*A Hyperion attached to the harness. Image from ZRock35 on the SlimeVR discord.*

Making your own chest harness can be daunting if you are not confident in your skills. Thankfully, the internet is littered with many harnesses made for GoPros at many price points. The one pictured above is the AmazonBasics harness costing a mere \$15 USD.

In order to use most of these harnesses, you will need to take some creative liberties with attachment. A simple method is to use sticky velcro or mounting tape. Alternatively, as the above image shows, you can strap it to the harness plate.

## Using Buckles

Making use of buckles requires some learning to ensure that your elastic is properly secured. The minimum amount of sewing will be to secure the ends of the elastic to stop them fraying. It is best to match the width of your buckle openings as closely to the width of your elastic (40mm elastic to 40mm buckles).

 [Side Release Buckles - How to Attach Adjust Fasten](#)

The video linked uses rigid webbing to demonstrate, but the same lessons apply to using elastic.

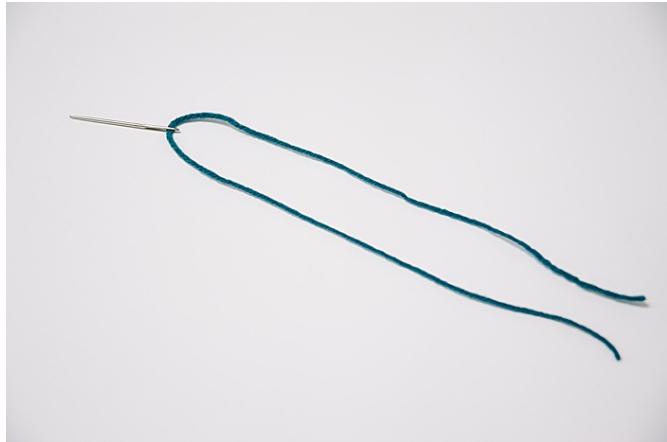
If you own or have access to a 3D printer, a few members of the community have created their own quick release buckle systems, available on the SlimeVR discord.



*An example of a 3D printed quick release buckle system created by mike\_ on the discord.*

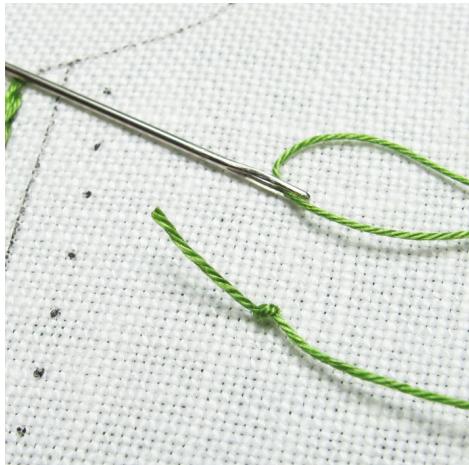
# Techniques to Learn

## Hand Stitching Techniques



The amount of thread that you will want to thread through your needle will depend, but a good rule of thumb is double the length of your hand to shoulder.

- Simple Thread Knotting Technique



Knowing how to tie a strong knot is essential in ensuring your strap doesn't come apart while you're using it.

[▶ The Fastest And Easiest Way To Knot Yo...](#)

- Backstitch



The backstitch is a simple and very strong stitch that will hold your velcro to the elastic very well.

[▶ Backstitch](#)

- Hand Overlock Stitch

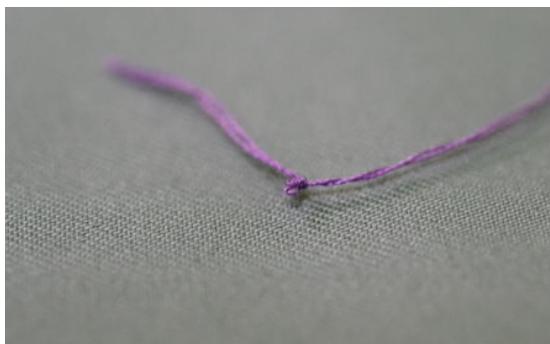


This stitch is used for preventing the raw edges of fabric or elastic from fraying and coming apart. This is only needed if you have not sewn the end shut by folding it over.

[How to Sew Overlock Stitch b...](#)

[Overlock Stitch by hand \(Basi...](#)

- Finishing Knot



A finishing knot is needed to keep your hard work from coming undone while you're wearing your trackers.

[Basic Hand Sewing - Tying a Finis...](#)

## Sewing Machine Stitches

This section assumes a basic familiarity with the operation of a regular sewing machine. For help on how to set up and operate a sewing machine, please look up sewing machine tutorials on YouTube.

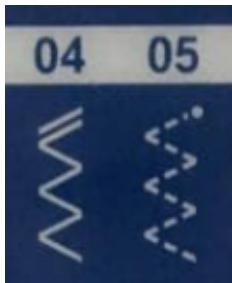
The most relevant stitches for straps on a sewing machine are the following:

- Straight Stitch



The straight stitch is the machine version of the backstitch. Very straightforward to use, but cannot stretch with the elastic. This is not so much of an issue unless you intend to sew many things to your straps.

- Zig Zag Stitch



The zigzag stitch is more suited for elastic, allowing the stitch to stretch as you pull the strap tight. Additionally, it can be used on the cut ends of the elastic to prevent them from fraying and coming apart instead of folding over the end. It is not as suited to this purpose as the overcasting stitch, but many low end machines do not have an overcasting stitch.

- Overcasting Stitch



The overcast stitch (aka the overlock stitch) is specifically for stopping the edges of fabric from fraying. Most mid and high end consumer sewing machines will have a multitude of overcast stitches to choose from, but these two are the most relevant for SlimeVR needs. Use these on the cut ends of the elastic if you don't want to fold them over.