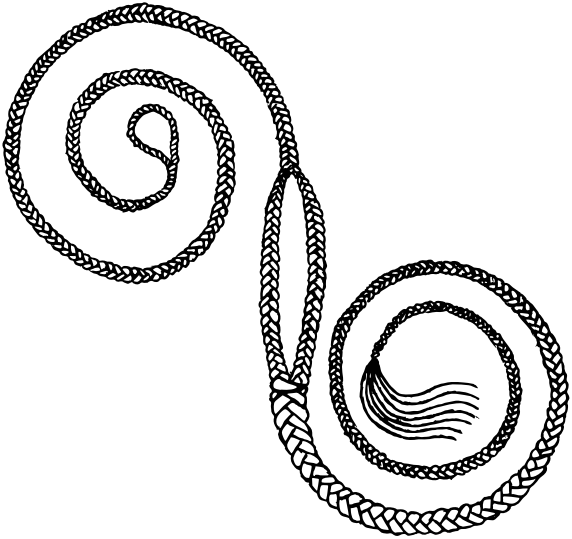
# KHERMADION

Issue 4



## How to make a Balearic sling

Khermadion Issue 4
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The fourth issue of Khermadion shows how to braid a Balearic-style sling.

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# 1 Introduction

Slinging has a long tradition on the Balearic Islands, and Balearic slings are among the finest types of slings. They are typically made out of loose esparto or sisal fibers, braided in one go from the finger loop to the cracker. Their cords have a rectangular cross-section and the resulting lateral stiffness offers great control over the pouch orientation during the throw, without impeding the release. The transition from the retention cord to the split pouch, often called the knee, is flexible, allowing the pouch to unfold more easily. In contrast to this, the transition from the pouch to the release cord, called the belly, is thicker and more rigid. This asymmetric weight distribution additionally improves the sling's release. The tapered release cord finally ends in a tassel of loose fibers, the cracker. Often, thin pieces of leather are sewn on the finger loop and on the split pouch, to make the former more comfortable and to protect the latter from abrasion. Figure 1 shows the structure of a Balearic sling.

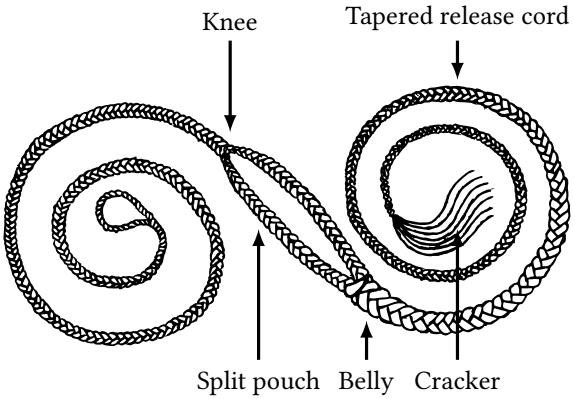



Figure 1: Characteristic features of a Balearic sling.

Instead of braiding with loose fibers, a Balearic-style sling can also be made from strings, as the following instructions will show. The manufacuring process is largely the same, but especially when first getting started with braiding, using yarn instead of loose fibers is much easier.

# 2 Herringbone braid

Balearic slings are braided with an odd number of strands in a herringbone pattern. The following instructions assume five strands. The more strands you use, the finer the resulting braid is, and the more pronounced its lateral stiffness becomes. On the other hand, more strands are more complicated to work with and require more time for the same length of braid. In general, five strands are a good compromise, especially for beginners.

When making a herringbone braid, the ordering of the strands alternates between two basic configurations. In both configurations, the strands are separated in two groups, with one group having exactly one strand more than the other. Both configurations are mirror images of each other, and by folding the excess strand over all other strands in its group to the inside of the other group, one configuration is changed into the other and the braid progresses. Figure 2 shows one of these two configurations for five strands, and how the excess strand is folded to change into the other configuration. Depending on the side on which the excess strand lies, the following instructions refer to the two configurations as L-configura-

tion, where the excess strand is on the left, and R-configuration, where the excess strand is on the right. To further facilitate their identification, the individual strands are numbered L1 – L5 and R1 – R5, respectively, starting from the excess strand.

Before folding over the excess strand, always pull it tight and twist it outwards, so that the upper side of the strand rotates away from you. Then fold it over the second and third strand to the other half.

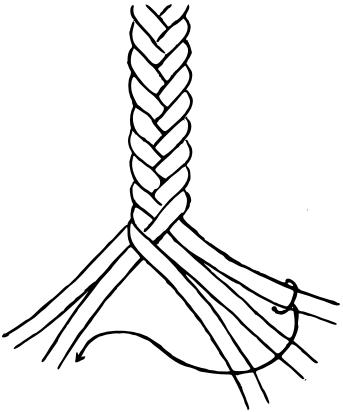


Figure 2: Structure of a five strand herringbone braid.

# 3 Yarn preparation

To begin the sling, you will need five strands which each consist of at least two strings. The combined weight of one strand should lie within $1\,\mathrm{g/m}$ to $3\,\mathrm{g/m}$. The length of each string should equal six times the final length of the sling, from finger loop to the center of the pouch. Many natural materials such as linen, hemp and cotton yarn are well suited for braiding a Balearic-style sling.

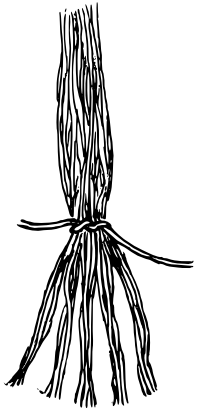
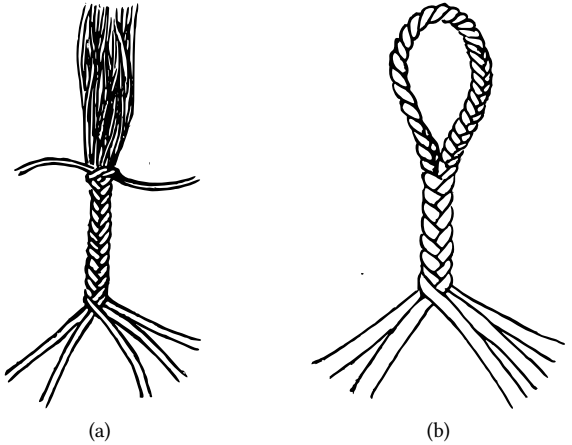


Figure 3: Five strands of yarn, tied together to begin the braid.

Once you have cut the strings to length, bundle them and tie them together in the middle using a short piece of string, as shown in figure 3.

# 4 Finger loop and retention cord

Wrap one half of the yarn bundle around your foot, for example, so that you can exert force on the strands when braiding. Sort the strings of the other half into five strands and start braiding, beginning in the R-configuration. Continue until your braid is about $10\,\mathrm{cm}$ long, so that it loosly fits around your middle finger. It should end in the R-configuration, as shown in figure 4 (a). Temporarily fix the open end of the braid using a clothespin or a short piece of string. Next, remove the other half of the yarn bundle from your foot and loosen the tie you made to bundle the strings. Form the finger loop by threading the braided section through a loop of strong cord fixed e.g. to your foot and merge the corresponding strands of both ends. Now each strand will have twice as many strings as before. Carefully pull the strands tight as you braid the first few steps of the retention cord, as portrayed in figure 4 (b). After that, continue to braid the retention cord until it is as long as the final sling shall be, less the length of the finger loop and half the length of the pouch.



(a) (b)

Figure 4: (a) The braided section which forms the finger loop. (b) The finished finger loop.

# 5 Knee

When beginning the knee, where the retention cord splits into the two halves of the split pouch, the strands of your retention cord should be in the R-configuration. Divide the strings of each strand in two groups of equal size and fold the resulting ten strands over each other according to the following pattern, each time twisting and pulling them tight beforehand.

| | | |
|---|---|---|
| Put K1 | over K2 – K6 | between K6 and K7 |
| Put K10 | over K6 – K9 | between K5 and K6 |
| Put K2 | over K3 – K6 | between K6 and K7 |
| Put K8 | over K4 – K7 | between K2 and K3 |
| Put K4 | over K5 – K8 | between K8 and K9 |
| Put K10 | over K8 – K9 | between K7 and K8 |

In each of these steps, K1 refers to the first strand from the right, K2 to the second, and so on.

After you have followed these steps, the strands K1 – K5 and K6 – K10 will each lie in the R-configuration. Clamp the right-hand strands K1 – K5 with a clothespin and braid the left-hand strands K6 – K10 for a few centimeters. Fix the loose end with a short piece of string and then do the same with the right-hand strands. Figure 5 shows the finished knee.

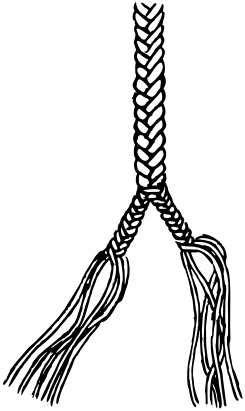


Figure 5: The finished knee.

# 6 Split pouch

Currently, the strands emerging from the knee are half as thick as the strands in the retention cord. To increase their thickness again, additional strings are added directly *after* the knee. If you would leave the pouch halves that thin, the pouch would be too light compared to the cords and the sling would not release well. On the other hand, if you added these additional strings before the knee, the transition from the retention cord to the pouch would be too stiff and cause the sling to release poorly as well.

First, prepare the additional strings. They should be as long as the strings which emerge from the knee. You need as many additional strings as there are in the retention cord. Once you have cut them, take half of the strings and put them next to you. Unbraid the strands of the left pouch half up to the knee and pull them tight once more. Now, as you braid these strands again, add one of the additional strings to the excess strand of each R-configuration before twisting and folding them over together. Take your time with this, and make sure to pull everyting tight.

After you have added all of the additional strings, continue to braid the pouch half until you have reached the desired length of your pouch. About $12\,\mathrm{cm}$ to $14\,\mathrm{cm}$ are suitable for most projectile sizes. Fix the end of the braid, which should be in the L-configuration, with a clothespin, and lay it aside. Figure 6 shows the finished left half of the pouch.

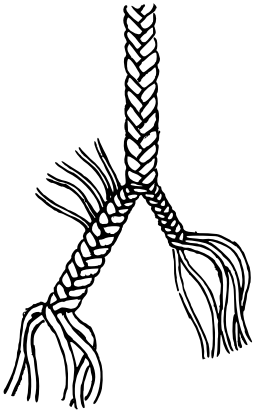


Figure 6: The left pouch half.

Now, repeat this process with the strands emerging from the right-hand side of the knee. Again, always add an additional string to R1 of each R-configuration until the braid is as thick as the retention cord and continue until it has reached the same length as the left pouch half. Figure 7 shows the finished pouch halves.

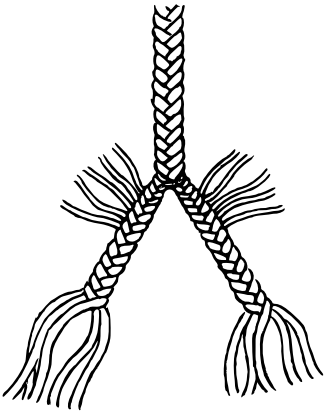


Figure 7: The finished pouch halves.

# 7 Belly

To join both pouch halves, spread their strands out and group them so that the corresponding strands of both halves lie next to each other. The five pairs of strands have to be ordered in such a way that they lie in seperate layers on top of each other. Put L3 on top, followed by L4, L2, L5 and finally L1. Take care that the braids of the pouch halves don't loosen up too much in the process. Figure 8 shows the properly sorted strands. Continue to braid with the merged strands twisting and pulling them tight carefully at each step.

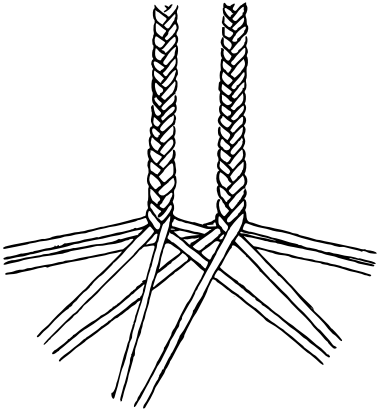


Figure 8: Ordering of the strands for joining the pouch halves.

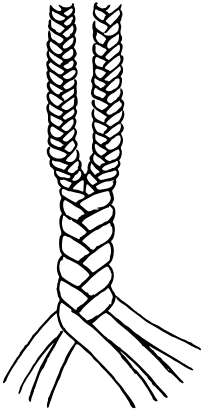


Figure 9: The finished belly.

# 8 Release cord

Braid the belly for a few centimeters. To taper the release cord, drop a single string from the excess strand R1 every $n$ R-configurations. Lay it aside each time and fold the strand over without the dropped strand. As long as $n$ is not divisible by the number of strands you are braiding with, or vice-versa, the thicknesses of the strands will decrease evenly. Initially, drop strands more quickly, i.e. every one or two braiding steps, and then continuously increase $n$ so that the rate at which the release cord tapers does not change abruptly. When the release cord has gotten slightly thinner than the retention cord, continue to braid without dropping further strings until the release cord has reached its desired length. In general, the release cord should taper quickly enough so that it is lighter overall than the retention cord overall.

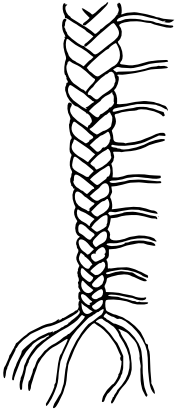


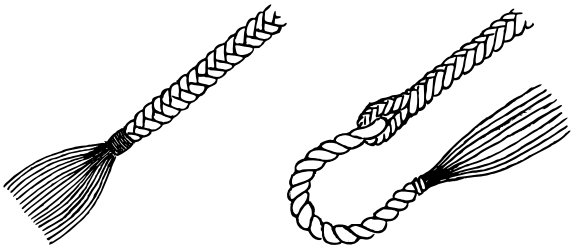
Figure 10: Tapering of the release cord.

# 9 Cracker

Traditionally, to finish the release cord, the strands are tied off closely behind the point where you pinch the release cord when holding the sling. The loose strands are then shortened to about a hand's width and produce a loud crack when slinging.

Nowadays, often synthetic fibers are braided into the end of the release cord, so that they gradually replace the natural fibers the sling is made of predominantly. This increases the cracker's lifespan, as it is subjected to high stress. Nevertheless, it has to be replaced eventually by unbraiding the release cord, removing the worn fibers and inserting new ones step by step.

When braiding a Balearic-style sling from strings instead of loose fibers, a better option is to create a small knot or loop at the end of the release cord. This allows to attach a separate, replaceable cracker.



(a) (b)

Figure 11: (a) The release cord ending in a tassel of loose fibers. (b) A replaceable cracker attached to a loop at the end of the release cord.

# 10 Waxing

Slings braided from plant fibers which easily absorb moisture benefit greatly from being waxed afterwards. This improves the sling's resistance to water and abrasion, at the cost of an increased weight.

To wax a sling, take a lump of bees wax and heat it briefly over a candle. Brush the soft wax on the sling and repeat this until the entire sling is covered with a layer of wax. Loosely coil the sling up and put it into a clean, heat resistant bowl. Now gently heat it using a heat gun or a baking oven set to $70\,^{\circ}\mathrm{C}$ to $80\,^{\circ}\mathrm{C}$. Wait until the molten wax has soaked into the sling's fibers. Remove the sling from the bowl and let it cool down. Then thoroughly flex the sling back and forth to reduce its stiffness. With use, the sling will slowly get more pliable.