



## Knots for Anglers

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### Objectives

Participating young people and adults will:

1. Practice tying some basic fishing knots
2. Practice knot selection for various applications
3. Practice some additional useful knots
4. Have fun while learning.

### Youth Development Objectives

Participating young people will:

1. Enhance fine motor skills
2. Practice decision making and problem solving
3. Enhance self-image and self-concept
4. Gain self-confidence
5. Increase recreational skills and stress relief
6. Explore practical science

### Roles for Teen and Junior Leaders

1. Assist with teaching area set up and break down
2. Deliver demonstrations on knot tying
3. Assist members in learning knots
4. Assist members in knot strength tests
5. Critique knots and aid in improving them
6. Conduct knot choice exercise

### Potential Parental Involvement

1. See “Roles for Teen and Junior Leaders” above

**Best Time:** Any time of year

**Best Location:** Comfortable work area

**Time Required:** 60-90 minutes

### Equipment/Materials

14-17 pound test monofilament (two colors)  
 heavy monofilament (30 to 50 pound test)  
 light cord fly line pieces  
 demonstration hook fly leader tying kit  
 yardstick or tape measure  
 nail clipper reel spool  
 fly tying vise pliers or hemostat  
 barrel swivels size 1-6 hooks  
 short dowels with small screw eyes in one end  
 8-10 # monofilament  
 \* yellow, orange, green, blue, clear

### References

- Practical Fishing Knots*, L. Kreh and M. Sosin, 1972. Lyons and Burford, NY.
- Practical Fishing Knots II*, M. Sosin and L. Kreh, 1991. Lyons and Burford, NY.
- McClane's Standard Fishing Encyclopedia*. A. J. McClane, ed., 1972. Holt, Reinhart and Winston, NY.

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2. Arrange for or provide teaching space
3. Arrange for or provide teaching materials
4. Arrange for or provide transportation
5. Arrange for or provide refreshments

*Fishermen's Knots, Fishing Rigs, and How to Use Them*, B. McNally. 1993. McNally Outdoor Publications, Jacksonville, FL.

### Evaluation Activities/Suggestions

Line manufacturer's literature

1. Evaluate changes in knot tying ability with repeated attempts at each knot selected.
2. Establish a decision making activity to match knots to the application.
3. Review activities for evidence of peer teaching and positive reinforcement.

### Safety Considerations

### Lesson Outline

Presentation	Application
<p>I. Knots and fishing</p> <p>A. Essential to make connections</p> <ol style="list-style-type: none"> <li>1. Quality of connection important</li> <li>2. Variation in knot strength</li> </ol> <p>B. Importance of good technique</p> <ol style="list-style-type: none"> <li>1. Sound, well-tied knots               <ol style="list-style-type: none"> <li>a. Maintain strength of line</li> <li>b. Remain secure</li> <li>c. Stand up to pressure</li> </ol> </li> <li>2. Poorly tied knots               <ol style="list-style-type: none"> <li>a. Low shock resistance</li> <li>b. Tendency to slip</li> <li>c. Reduce line strength significantly</li> </ol> </li> </ol> <p>II. Attaching line to reels</p> <p>A. Arbor knot</p> <ol style="list-style-type: none"> <li>1. Tying procedure               <ol style="list-style-type: none"> <li>a. Pass tag end around spool</li> <li>b. Tie overhand knot around standing end</li> <li>c. Tie another overhand knot beyond first</li> <li>d. Pull second knot tight and trim</li> <li>e. Draw first knot tight</li> <li>f. Second knot should touch first one</li> </ol> </li> <li>2. Usefulness               <ol style="list-style-type: none"> <li>a. Easily tied and simple</li> <li>b. Weak connection</li> <li>c. Will not hold in monofilament lines</li> <li>d. Fine if never "spooled" by a fish</li> </ol> </li> </ol> <p>B. Improved clinch knot</p> <ol style="list-style-type: none"> <li>1. Around standing line               <ol style="list-style-type: none"> <li>a. Intermediate strength</li> <li>b. May slide until a few wraps are made</li> <li>c. Weak point if spooled by fish</li> </ol> </li> </ol>	<p><b>PROVIDE</b> each member with two pieces of monofilament about 8 to 12 pound test. Using gloves or small pieces of dowel to protect their hands, have them attempt to <b>BREAK</b> the line by pulling steadily on it. Then tie an overhand knot in the middle of each remaining piece and have them repeat the test. (See fact sheet - <i>Testing Knot Strength</i>) <b>DISCUSS</b> the differences in perceived breaking strength. (An overhand knot decreases the breaking strength of the line to about half its normal strength. ) <b>ASK</b> what made the difference (the knot) and how that could be important to them while fishing. <b>NOTE</b> that all anglers need to use knots to connect their lines to their other tackle and to the fish.</p> <p><b>DEFINE</b> tag end as the short end of the line and standing end as the line going to the spool or reel.</p> <p><b>DIAGRAM</b> the knot and show how it is tied with a dowel as the spool and a piece of moderately heavy cord as the "line."</p> <p><b>NOTE</b> that the connection includes two single layers of line and tends to cut itself under heavy pressure.</p> <p>Ask participants to <b>DETERMINE</b> which of these they would like to use in light monofilament line. Which one would they choose for attaching fly line backing to a spool?</p>

2. Improved clinch knot around arbor or spool
  - a. Much stronger connection
  - b. May slide until wrapped
  - c. About 90 percent knot strength

### III. Connecting line to terminal tackle

#### A. Improved clinch knot

1. Designed for monofilament lines

2. Better than 90 percent knot strength

#### 3. Tying procedure

- a. Pass tag end through hook eye (etc.)
- b. Wrap tag end around standing line
  - 1) 3-4 times in heavy lines
  - 2) 7 or more in light lines
- c. Pass tag end through opening between tag end and standing line
- d. Pass tag end through loop just formed
- e. Hold tag end
- f. Moisten knot with saliva
- g. Pull steadily on standing end to tighten securely
- h. Trim tag end neatly with clippers

#### 4. Variations

- a. Twice through improved clinch knot
  - 1) Pass tag end through eye twice to form loop
  - 2) Proceed as above
  - 3) Pass tag end through loop and opening between lines
  - 4) Finish as above
  - 5) Better knot strength - very light line
- b. Double improved clinch knot
  - 1) Double a short section of line
  - 2) Tie a clinch knot with doubled line
  - 3) Better abrasion resistance - light

line

#### B. Palomar knot

1. Excellent knot strength (nearly 100%)
2. Excellent knot for co-polymer lines
3. Simple, compact knot
  - a. Pass doubled tag end through eye
  - b. Tie loose overhand knot around standing end
  - c. Pass loop over hook, lure, etc.
  - d. Hold loop forward
  - e. Pull on both ends to tighten

#### C. Kreh end loop knot

1. Many loop knots for attaching lures
  - a. Variable in strength
  - b. Some close when pressure applied
2. Strength and loop stays open
  - a. Jig and other lures
  - b. Better lure action

**DEMONSTRATE** tying an improved clinch knot and have the members **TIE** one of their own using the screw eye and dowel for a "lure". [*Working in small groups with parents or teen leaders as guides and assistants works best.*]

**NOTE** that moistening the line before it is drawn tight keeps it cool, helps the tier clinch the knot down tightly, and prevents abrasion as the line rubs against itself. All of these things can weaken the line and the knot.

If desired, **DEMONSTRATE** these knots and have the members **PRACTICE** one of their own. Since the procedure is the same, doing these knots reinforces the original one.

**DEMONSTRATE** and have members **TIE** one or more Palomar knots. You may want to conduct a relative knot strength test between the improved clinch knot and the Palomar knot. Simply tie each knot on an eyed dowel. Being careful to apply pressure steadily and to avoid putting the line in the gap where the screw eye is closed.

- c. Proper tying vital
- 3. Tying procedure
  - a. Tie a loose overhand knot in line
    - 1) About 8 inches from end of line
    - 2) Pass tag end through hook eye
  - b. Return tag end through knot
    - 1) Keep original knot open
    - 2) Back through same side
  - c. Wrap tag end around standing end
    - 1) 3-4 turns for heavy line
    - 2) 5-6 turns for medium weight lines
    - 3) 7-8 turns for lines 4 pound or less
  - d. Pass tag end back through overhand knot
  - e. Pull both ends to secure knot
- D. Snell knot
  - 1. Attaching hook to line
    - a. Bait hooks
    - b. Trailer hooks
  - 2. Strong attachment
    - a. Grasp hook in fingers of one hand
    - b. Pass line through eye toward bend
      - 1) May be omitted if desired
      - 2) Several inches of line needed
    - c. Loop the line
      - 1) Toward eye and back
      - 2) Tag end near end of shank
      - 3) Grasp loop near eye
    - d. Wrap top strand of loop around shank
      - 1) Wrap toward bend of hook
      - 2) 5-7 turns of line
      - 3) Bottom of loop stays atop shank
    - e. Pull standing end to tighten
      - 1) Forms compact loops around shank
      - 2) Pull tag end to check
      - 3) Trim tag end
- E. Break-away knots
  - 1. Sometimes important for bottom rigs
  - 2. Losing part of a rig to save the rest
  - 3. Usually used with sinkers
  - 4. Options
    - a) Lighter line than main rig
    - b) Overhand knot above sinker
- IV. Connecting lines of nearly equal diameter
  - A. Blood knot
    - 1. Nearly line strength
    - 2. Compact
    - 3. Diameter differences up to 0.003-0.005
    - 4. Simple to tie
      - a. Cross tag ends over each other
      - b. Wrap one tag end around other standing end
        - 1) Wrap away from crossing point

**STRESS** the importance of keeping all three pass-throughs by the tag end going through the first overhand knot in the same way! This keeps the knot from cutting itself.

**STRESS** the importance of drawing the knot down snugly as it is being tied.

**NOTE** that this knot is much easier to tie than it is to describe. **DEMONSTRATE** it with large line and a huge hook, then have the participants **TIE** their own with help from teen leaders and parents. **NOTE** that it can simply be tied around shanks if desired, particularly on ringed eye hooks.

**ASK** the group if there is ever a time when they want the line to break. **DISCUSS** situations where breaking the line to a sinker could save the rest of a rig and reduce the time required to get back into action.

Be sure to **USE** different colors of lines in tying these knots for demonstration purposes, so the members can see the knot develop more easily.

- 2) Minimum of three wraps
  - 3) More wraps with lighter lines
  - 4) Up to 7 or 8 with light lines
  - c. Push tag end back through starting point
  - d. Hold tag end
  - e. Repeat process with other lines
    - 1) Wrap in opposite direction
    - 2) Same number of wraps
  - f. Insert tag end through opening in knot
    - 1) Same location as first one
    - 2) Opposite direction from first one
  - g. Moisten
  - h. Pull standing ends to set knot
  - I. Hold tag ends until tightening starts
  - j. Trim tag ends carefully
  - k. Check for security of knot
- B. Barrel knot
- 1. Very similar to blood knot
  - 2. Wraps back toward cross-over point
  - 3. Slightly weaker than blood knot
  - 4. Some find it easier to tie
- C. Surgeon's knot
- 1. Finished looks like blood or barrel knots
  - 2. Easy to tie
    - a. Overlap lines about 12 inches
    - b. Tie one overhand knot in crossed lines
    - c. Repeat one or more times
    - d. Hold all four lines
    - e. Draw all ends tight together
    - f. Moisten and pull on standing ends
    - g. Trim away excess tag ends
- D. Double nail knot
- 1. Strong, smooth knot
  - 2. Complex tying process
    - a. Cross two tag ends over each other
    - b. Lay nail or tube beside one tag end
    - c. Wrap 4-6 turns over nail
      - 1) Toward standing end of same strand
      - 2) Over other line
    - d. Insert line under wraps along nail or through tube
    - e. Extract tube, holding loops
    - f. Pull standing and tag ends to tighten wraps
    - g. Alternate between lines
    - h. Pull on standing ends to tighten
      - 1) Leave no slack between the knots
      - 2) Snug down firmly
    - I. Trim tag ends
    - j. Useable joining lines of different diameters

## V. Connecting line to shock tippets

**DEMONSTRATE** this knot if desired. **NOTE** that most youngsters have more trouble tying this poorer knot than the better blood knot. May be omitted or merely mentioned at the leader's discretion.

**DEMONSTRATE** this knot if desired. It is essentially a double or triple overhand knot tied in the tag end of the line with an overlapped tag end of the leader. Properly tied it is a very strong knot.

If desired, **DEMONSTRATE** this knot and have participants **TIE** it. One of the best tools for the nail knot is a large gauge needle with the point cut off and beveled (check local laws on possession of even modified needles). A small plastic or brass tube can be used effectively as well. This knot could be tested against similar blood knot to determine if any difference in knot strength is worth the effort.

- A. Albright Special knot
  - 1. Two lines of very different diameter
    - a. 20-80 pound test leaders
    - b. Light spinning lines or leaders
  - 2. Often used in fly fishing applications
  - 3. Simple tie
    - a. Bend heavy line back on itself
    - b. Pass smaller line up through loop
    - c. Wrap 10-15 times toward closed end of loop
    - d. Pass tag end of light line through loop
    - e. Pull both ends of light line to tighten and lock
    - f. Trim tag ends of both lines
- B. Improved blood knot
  - 1. Lines of very different diameter
  - 2. Double lighter line
  - 3. Tie as for blood knot

**DEMONSTRATE** tying an Albright Special knot using 8 to 10 pound test monofilament and 40-80 pound test shock leader. Have each participant **TIE** a similar knot with the assistance of teen leaders or parents.

**DEMONSTRATE** the improved blood knot. **NOTE** that it is used in the same types of situations as the Albright Special. Lines need to be a bit closer to the same size, e.g. 10 pound test and 30 or 40 pound test, to use this knot effectively.

## VI. Knots for fly fishers

- A. Nail knot
  - 1. Attaching leader butt to line
  - 2. Tying procedure
    - a. Lay nail or tube along tip of fly line
    - b. Lay leader material along tube
    - c. Wrap tag end of leader material
      - 1) Around lines and tube
      - 2) Toward tip of fly line
    - d. Insert end of leader material in tube
    - e. Hold loops in place
    - f. Extract tube or nail
    - g. Cinch knot down firmly
      - 1) Pull alternately on ends of leader
      - 2) Keep wraps snugly together
      - 3) Pull until firmly cinched in place
    - h. Pull on standing end of leader and fly line
    - i. Trim butts of both leader and fly line
    - j. Coat knot cement (e.g. Pliobond®)<sup>1</sup>
- B. Perfection loop
  - 1. Loops used in many ways
    - a. Connecting two lines
    - b. Connecting snelled hook to line
    - c. Connecting dropper to dropper loop
  - 2. Tying procedure
    - a. Form a loop in the tag end of line
    - b. Form second loop over and around first
    - c. Pass tag end between two loops
    - d. Reach through first loop and pull second one through
    - e. Hold loop open
    - f. Hold tag end
    - g. Moisten and tighten

If desired, **DEMONSTRATE** the nail knot using a short piece of waste fly line and a heavy piece of leader material. Have each member attempt to **MAKE** the knot with the assistance of adult or teen leaders. **CRITIQUE** each knot and suggest ways to correct any errors in the tying process. Keeping the wraps close together is one of the greatest challenges.

**NOTE** that this knot can be tied after passing the leader through the center of the fly line. This is sometimes called a needle knot

**DEMONSTRATE** the perfection loop and have participants **TIE** one or more until a strong knot is accomplished.

**NOTE** that this is the same knot as the surgeon's knot except that it is tied in an intact line rather than as a way of joining two lines. **DEMONSTRATE** the knot and have members **TIE** one with the

- h. Trim tag end
  - C. Surgeon's loop
    1. Easy to tie
    2. Strong loop knot
    3. Tying instructions
      - a. Form loop in tag end of line
      - b. Pass terminal end through loop twice
      - c. Moisten and pull tight
  - D. Dropper loop
    1. Used to create a dropper loop
      - a. Attach looped dropper leaders
      - b. Attach other terminal tackle
    2. Tying procedure
      - a. Bend line into a loop
      - b. Hold single line at bottom of loop
      - c. Wrap doubled line around itself
      - d. Push loop through opening between doubled lines
      - e. Pull tight
  - E. Extension blood knot
    1. Used to create a dropper
      - a. Multiple fly casts
      - b. Sinker for deep drifts
    2. Tying procedure
      - a. Blood knot as above
      - b. Leave about 8-10 inches of tag end
      - c. Trim other tag end a bit long
- VII. Many other useful knots
- A. Fishing knots
    1. Bimini twist
    2. Duncan loop (uniknot)
    3. Jansik special
    4. George Harvey knot
  - B. Boating knots
    1. Square knot
    2. Bowline
    3. Clove hitch
    4. Two half-hitches
    5. Taut line hitch

assistance and help of teen or adult leaders.

**NOTE** that this is essentially a blood knot or barrel knot tied in an intact line, producing a fixed loop in the leader.

**DEMONSTRATE** the knot and have members **TIE** one under the supervision of teen or adult leaders. **NOTE** that this knot requires a bit more dexterity than the simple blood knot because the long tag end is a bit more difficult to manage. If necessary, **ALLOW** the participants to work in pairs to get the knot tied. Make sure the knot is very snugly tied and that a bit of extra tag is left on the opposite side from the dropper.

If desired, **ADD** these knots to the lesson. For beginning anglers, the previous set of knots is completely adequate and will consume a full lesson.

## Summary Activity

Pose a series of scenarios in which the participants must select and tie a knot to suit a situation. Tailor the scenarios to the skill level of the participants and their level of angling experience. A contest or game with teams selected by the instructors and gag prizes might be appropriate.

## Lesson Narrative

Knots are an essential part of fishing. Anglers cannot fish without attaching hooks or lures to their lines or lines to their reels. Knots determine the quality of the connection between the angler and the fish. Often, they are the weakest link between the fish and the angler. Since the type of knot determines the potential strength of the connection and the way knots are tied can affect their actual strength, the way the knots are tied is important to the angler's success. Learning to select and tie appropriate knots is a skill all accomplished anglers should achieve. The presence of a mentor or guide in the process is one of the most important factors in that learning process.

### Attaching Line to Reels

Whenever reels must be loaded with line, the first knot that must be tied is one that attaches the line to the reel's arbor or spool. A modification of the jam knot often is used to attach a line to the spool. Although it is not a particularly strong one, the **arbor knot** is used to attach a line to the reel. It is basically a pair of overhand knots tied in the following manner. First pass the tag end of the line through any necessary parts of the reel (level wind mechanism, bail, etc.) and around the arbor. Then tie an overhand knot in the tag end, passing the open loop of the overhand knot around the standing end of the line. Tie another overhand knot in the tag end of the line, pulling it tight. Gently pull on the standing end of the line to draw the knot around the standing end tight with the other knot down against it. Finish the knot by trimming the tag end of the line short. This knot is likely to break if the angler is "spooled": by a fish, so many anglers prefer a stronger connection.

A much stronger connection can be made by using an improved clinch knot (below) around the standing end of the line and drawing it tight. Some anglers use a clove hitch backed with a couple of half hitches (below) as well.

### Knots for Attaching Terminal Tackle

One of the basic knots for attaching terminal tackle is the **improved clinch knot**. This common knot is used for attaching line to terminal tackle, particularly with monofilament lines. Well tied, it has excellent knot strength – exceeding 90 percent. The knot is initiated by passing the tag end of the line through the eye in the hook or other terminal tackle. Wrap the tag end around the standing end of the line an appropriate number of times, 3-4 times for heavy lines and up to 7 or more times for light ones. Pass the tag end of the line back through the opening between the standing and tag ends at the eye, and then through the loop that was just created. Hold the tag end. Moisten the knot with saliva, and pull steadily on the standing end to tighten the knot securely. When the knot is cinched down tightly, trim the tag end to complete it.

In light lines, a variation of this knot can add a bit of knot strength if it is well tied. When the line is passed through the eye, carry it back through the eye to form a complete loop. Complete the remainder of the knot as usual, but pass the tag end through the closed loop and the opening between the lines. Complete the knot by carefully drawing it tight.

Doubling the line before tying the knot produces one with a bit more abrasion resistance, the double improved clinch knot. Like the previous one, this knot can be a bit difficult to draw tight. Remember that knots that slip are the ones that break under pressure.

**Palomar Knot** – The Palomar knot is both simple to tie and has outstanding knot strength, approaching 100 percent of the line strength. It works well for monofilament, co-polymer and braided lines. The knot lies compactly, belying its strength. Start tying it by passing a doubled piece of line through the eye (or by passing the tag end through the eye then back through it). To start out, give yourself plenty of line to work with. Tie a loose overhand knot around the standing end and the tip of the tag end using the doubled portion of the line. Next, pass the loop over the swivel, hook or lure. Moisten the knot and draw it tight by

pulling on both the standing and free ends of the line. If they cannot be pulled tight simultaneously, pull each piece alternately until The knot is tightly cinched down.

**Kreh End Loop Knot** – Many loop knots have been used to attach lures while allowing them to move freely, having better action. It works well with jigs and is one of the better knots for allowing streamers or bucktails to move freely while using heavy shock leaders or tippets. Most other loop knots either lack knot strength or tend to close when pressure is applied. The Kreh loop knot was designed by Lefty Kreh for this purpose. Properly tied and cinched down, the knot is very strong and will not collapse on itself when pressure is applied. Start by tying a loose overhand knot in the line, leaving about 8 inches of tag end beyond the overhand knot. Pass the tag end through the hook eye, then back through the overhand knot, making sure the tag end passes through the overhand knot in the same way it emerged from it. Make the primary loop fairly small. Wrap the tag end around the standing end of the line above the overhand knot, taking 3-8 turns. Pass the tip of the tag end back through the overhand knot (again being careful to go through the knot in the same way). Moisten the knot and pull both ends to cinch the knot down. The number of turns taken with the tag end is specific to the line strength. Lines in excess of 20 or 25 pounds need only 3-4 turns, medium weight lines in the 6-15 pound class require 5-6 turns, and light lines (4 pounds or less) need 7-8 turns for maximum strength.

**Snell Knot** – The snell knot is used to attach hooks to a leader or line. It can be used with bait hooks, trailer hooks, or tandem hooks in fly tying. Gang rigs using several snelled hooks on a single leader are often used in fishing live or dead baits, like night crawlers or large bait fish. This knot provides a strong attachment with a straight pull from the line to the hook shank. In some ringed eye hooks, the snell knot is tied around the shank behind the eye without passing through it.

To tie the snell knot, grasp the hook in the fingers of one hand. Pass the line through the eye toward the back of the hook. Pull enough line through the eye to form a modest loop, leaving the tag end along the shank. Grasp the loop near the eye, and start winding the forward part of the loop around the shank, applying 5 to 7 turns toward the bend of the hook. Pull on the tag end of the line to start tightening the loops. Pull on the standing end of the line to finish the process, sliding the loops forward before the final tightening. Trim the tag end closely to finish the knot.

### **Break-away Knots**

On some occasions, an angler wants to tie a knot that will break away. Generally these situations are associated with wanting to sacrifice some portion of the terminal tackle to save the remainder. Where snags are prevalent, anglers may choose to sacrifice the sinker in order to save the rest of the rig and to get back into fishing quicker after a hang-up. Several options are available. One of the more simple ones is to use a lighter line for the dropper holding the sinker. Another is to add to the probability of breaking the line at the desired point by tying a simple overhand knot in the dropper line above the sinker.

### **Knots for Connecting Lines of Nearly Equal Diameter**

Every angler encounters the need to connect one line to another. For those that are nearly equal in diameter, one of the best connections is the blood knot.

**Blood Knot** – For lines of nearly equal diameter, this knot is compact and retains nearly 100 percent line strength. It is suitable for lines that differ no more than about 0.003-0.005 in diameter, particularly with light lines. Attempting to connect lines of much greater difference in diameter can result in knots that slip or weak knots that do not carry the line strength of either line. This knot is a simple one to tie. Cross about 6-8 inches of the two tag ends, holding them between the thumb and forefinger of one hand. Select one tag end and wind it over the standing end of the other line a minimum of three to 7 turns. Insert the tag end through the crossing point of the lines and hold it out of the way. Repeat the process with the other tag end, winding the same number of wraps in the opposite direction and inserting it through the cross-over point in the opposite direction. Hold the tag ends and pull on the standing ends to start tightening the knot. As it begins to close, moisten the knot and pull firmly on the standing ends to snug the knot firmly. Trim the tag ends closely and test the knot for security. It is critical to have enough turns in the knot for the line diameter or strength – 3-4 turns is adequate for heavy lines, but as many as 7-8 turns may be required for lines 4 pound test or less.

**Barrel Knot** – This knot is slightly more likely to slip than the blood knot, but properly tied it can be very nearly as strong as the blood knot. Some people find it easier to tie. Start by tying an overhand knot in the two tag ends. Bend the knotted line around so the standing ends are crossed. Wind the knotted middle of the knot around the two standing ends. (Essentially this is a blood knot with the wraps coming back toward the crossover point rather than away from it.) Separate the two standing ends in the middle of the wraps, and poke the knot through the opening. Moisten the knot and pull on the standing ends to cinch it down snugly.

**Surgeon's Knot** – The surgeon's knot is similar in appearance to the blood knot and the barrel knot, but it is tied in a different manner. Start by overlapping the two lines for about 12 inches. Form a loop by bending them in a circle. Pass one line and the tag end of the other through the loop, then repeat the process at least one or two more times. Holding both the tag ends and standing ends together, moisten the knot and draw all the ends tightly together. Finish by pulling on the two standing ends to form a tight knot. Trim away the excess material on the tag ends. This knot will work even with monofilaments that are a bit more different in diameter than will the previous ones. Properly tied, it is a very strong knot.

**Double Nail Knot** – The double nail knot is a strong, smooth knot that is essentially each line snelled around the other. The tying process is fairly complicated, and extra hands are helpful until the process is well learned. Because of the process, the knot is useful with both lines of nearly equal diameter and with those that differ significantly. Cross the two tag ends over each other, leaving tags of about 8-10 inches. Lay a nail or thin tube along the standing end of one line. Wind the tag end of that line back toward the standing end and over the nail or tube from 4-6 turns, keeping the turns tightly together and holding them in place. Insert the tag end in the tube and withdraw it with the line from under the loops just formed. Pull gently on both the tag end and the standing end to draw the wraps tightly down on the other line. Repeat the process with the other line. Moisten the knot and pull on the standing ends of the lines to bring the knots together. Alternately pull on the tag ends and the standing ends of each line to cinch the knot down tightly. Once the knot is tight, trim the tag ends to finish the knot. [Note that a large gauge needle cut off and beveled or an extremely small tube (just big enough to pass the line through) makes tying this knot neatly much easier.

#### **Connecting Line to Shock Tippets**

Many anglers have occasion to use a heavy monofilament shock tippet of 40 to 80 pounds, connecting it to their normal line or leader. A double nail knot might work with lines that are nearly the same stiffness; but for most real shock tippets, a different approach is essential.

**Albright Special Knot** – One of the best shock tippet knots for lines very different in diameter is the Albright Special. While it is useful with spinning lines and monofilament shock leaders, it is most often used in fly fishing. It is a simple knot to tie, depending upon the greater stiffness of the heavy shock tippet to form a locked loop. Start by bending the heavier line back on itself to form a loop. Insert the lighter line through the loop and take 10 to 15 turns back toward the starting point with it. Pass the tag end of the light line through the closed end of the loop. Hold both ends of the light line in one hand and both ends of the shock tippet in the other. Moisten the knot and pull on the knot to tighten it. Once the knot is firmly locked, trim the tag end, leaving a small tag.

**Improved Blood Knot** – The improved blood knot is almost exactly the same as the blood knot. The exception is that the lighter line is doubled before beginning to tie the knot. This results in a knot that will tighten adequately. Although this knot will permit considerable difference in the line diameters, it will not cover differences on the order of the Albright Special.

#### **Knots for Fly Fishers**

Fly fishermen encounter the need for a variety of knots, including those above. Others may be used in setting up a cast, attaching a leader, attaching backing to a fly line, or simply repairing a tippet.

**Nail Knot** – This knot was explored earlier as the double nail knot. Its primary use is in attaching a leader but to a fly line or attaching backing to the tail of a fly line. Start tying the knot by laying a nail, needle, or

tube along the tip of the fly line. Lay the leader material beside the tube with about 10 inches or so of material beyond the tube. Wind the leader around the fly line and tube, laying tight turns back toward the tip of the fly line. Once satisfied with the number of turns, push the end of the leader material back through the needle or tube to emerge where the windings began. Holding the turns of line and the fly line in the fingers to keep everything aligned pull the needle or tube off the tag end of the leader material. Pull alternately on the tag and standing ends of the leader to begin closing the loops on the fly line. Continue the process until the turns lie tightly together and are bound tightly to the fly line. I usually find that grasping the tag end with pliers and wrapping the butt section around the hand allows adequate pressure to bind the materials down firmly. On the last pull, grasp the fly line and the leader, allowing them to set up in line, then trim the tag ends closely. Finish the knot by putting a drop of Pliobond® or a similar cement on the entire knot, rolling the cement between the fingers to form a football-shaped element that will flow easily through the guides of a flyrod.

The nail knot can be turned into a needle knot by simply inserting the tag end of the leader or backing material through the center of the fly line before tying the knot. This approach has the advantage of being a bit smoother in passing through the guides.

**Perfection Loop**— Loops are used in many ways by anglers - connecting two lines, connecting a snell to a leader or line, or connecting a dropper to a dropper loop. The perfection loop is formed by forming a small loop in the end of a line. A second loop of about the same size is then formed. Reach through the first loop and pull the second one through it. Retain your grip on the tag end, moisten the material and pull it tight. The resulting loop is nearly round in moderately stiff materials.

**Surgeon's Loop**— The surgeon's loop is essentially the same as a surgeon's knot tied in a doubled, intact line. It is a strong loop knot that tends to lie a bit closer. Start by doubling the tag end of the line. Bend the end of the line into a loop, then pass the doubled end through that loop at least twice. Moisten the knot and pull it tight.

**Dropper Loop** — The dropper loop is essentially a barrel knot tied in an intact line. It is used to attach looped dropper leaders to the main leader in building a multiple fly cast, commonly used by wet fly anglers. It can also be used in building bait rigs, combination lure rigs, or attaching other types of terminal tackle. Begin tying the dropper loop by bending the leader material or line into a fairly large loop. Wind one piece of the loop around the other one (you must keep one stable to do this) at least 4-7 times. Push the active loop (the one you are wrapping) through an opening between the wraps on the second line. Moisten the line, hold the loop open with one hand of your lips, and pull on both ends to draw the wraps tight.

Another way to form a dropper is to tie an **extension blood knot**. Simply tie a blood knot as usual, but leave one tag end at least 8-10 inches long as the knot is tightened. This knot may be a bit stronger than the dropper loop, but it does suffer occasionally from being pulled apart. To prevent that from happening, remember to keep the extended tag end as a part of the leader going directly to the main line rather than the end following it.

### **Other Useful Knots**

There are many other knots useful to the angler, some for fishing and others for working with boats or cargo. For offshore anglers, learning the Bimini twist may be important. For anglers who cannot tie the Palomar or improved clinch knots, perhaps the Duncan loop or uni-knot would be a valuable addition. The Jansik special and George Harvey knots are useful as well, as are the @turle knot and others. All of these go beyond the basics and can be learned with a good text or teacher who is willing to share them.

Boaters and packers will find abundant use for some other knots, the square knot is one of the fundamentals that can be used in many situations. Half hitches are useful in taking care of loose line or making a temporary attachment. The bowline is a loop knot that will not slip or close yet is easy to untie when needed. Clove hitches, particularly when backed by a half-hitch or two provide secure attachment for anchor lines or similar items. The sheep shank is a method of shortening a line without re-tying or cutting it. The taut line hitch is very useful in binding down equipment where you need a tight line.

Spend some time learning knots. You will find them both useful and interesting. Learn to test them to see if you have an improvement on one that is old and familiar. Above all learn to choose the right one for the purpose at hand.

### **Exhibit or Sharing Suggestions**

1. Prepare an illustrated talk or demonstration on a selected knot and present it to an appropriate audience.
2. Assist other anglers in learning to tie some of the knots you have learned.
3. Make a photographic essay that illustrates a knot of your choice.
4. Give a demonstration on relative knot strength, discussing factors that make knots break.
5. Make a knot board using heavy monofilament or colored cord, illustrating how to tie some useful fishing knots.

### **Community Service and "Giving Back" Activities**

1. Participate in a National Hunting and Fishing Day celebration or a similar activity, teaching fishing knots to the public.
2. Participate in a youth fishing day or similar activity in your community, assisting young anglers in setting up their tackle and learning to tie good knots.
3. Serve as a teen leader for your club, teaching about knots and knot tying.

### **Extensions or Ways of Learning More**

1. Conduct a series of experiments using potential knots for several purposes and seeing which ones are stronger or more consistent. Share your results with others who are interested.
2. Obtain or check out a book on fishing knots (see references section) and practice those knots on your own.
3. Explore the origins of various knots and the purposes for which they were designed. Share that knowledge with your club or another interested group.
4. Study the origins of various fishing lines and the materials used in making them. Relate the nature of the lines to the knots used in them.

### **Links to Other Programs**

Knots are useful in everything from making a secure package to packing either with a backpack, horseback or by boat or other vehicles. They can be used in making useful items from macrame to nets or hammocks. While many of these things can relate either directly or indirectly to fishing, the skills used apply to other programs as well. Tomato stakes do not help if a useful knot to bind the vines to the stake is not available. Lashing a tarp over other materials requires the use of knots. Making a knot board may require some basic or advanced wood working skills. Knots are useful in many other areas. Think about the applications briefly.

The use of Pliobond® in this text does not imply endorsement of the product or any censure of similar products on the market. It is simply included as a material useful to the angler in forming the knot in question.

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