Suture Coding: A Novel Educational Guide for Suture Patterns

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OBJECTIVE: This study aims to provide a helpful guide to perform tissue suturing successfully using suture coding—a method for identification of suture patterns and techniques by giving full information about the method of application of each pattern using numbers and symbols. Suture coding helps construct an infrastructure for surgical suture science. It facilitates the easy understanding and learning of suturing techniques and patterns as well as detects the relationship between the different patterns.

METHODS: Guide points are fixed on both edges of the wound to act as a guideline to help practice suture pattern techniques. The arrangement is fixed as 1-3-5-7 and a-c-e-g on one side (whether right or left) and as 2-4-6-8 and b-d-f-h on the other side. Needle placement must start from number 1 or letter "a" and continue to follow the code till the end of the stitching. Some rules are created to be adopted for the application of suture coding. A suture trainer containing guide points that simulate the coding process is used to facilitate the learning of the coding method.

RESULTS: (120) Is the code of simple interrupted suture pattern; (ab210) is the code of vertical mattress suture pattern, and (013465)²/3 is the code of Cushing suture pattern. (0A1) Is suggested as a surgical suture language that gives the name and type of the suture pattern used to facilitate its identification. All suture patterns known in the world should start with (0), (A), or (1). There is a relationship between 2 or more surgical patterns according to their codes.

CONCLUSIONS: It can be concluded that every suture pattern has its own code that helps in the identification of its type, structure, and method of application. Combination between numbers and symbols helps in the understanding of suture techniques easily without complication. There are specific relationships that can be identified between different suture patterns. Coding methods facilitate suture patterns learning process.

CLINICAL RELEVANCE: The use of suture coding can be a good approach to the construction of an infrastructure of surgical suture science and the facilitation of the understanding and learning of suture pattern techniques. (J Surg Ed 72:995-1004. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEYWORDS: suture coding, novel code, educational guide, suture pattern, suture technique

COMPETENCIES: Medical Knowledge, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

The word "suture" describes any strand of material used to ligate (tie) blood vessels or approximate (bring close together) tissues. Sutures are used to close wounds.[1] The earliest reports of surgical suture date back to 3000 BC in ancient Egypt. The oldest known suture was in a mummy from 1100 BC. The earliest detailed description of wound suture and suture material used was by the Indian sage and physician Sushruta, written in 500 BC. In his writings, the Greek "father of medicine" Hippocrates described suture techniques, as did the later Roman Aulus Cornelius Celsus. In the 2nd century, Roman physician Galen described gut sutures. In the 10th century, the manufacturing process of suture materials involved harvesting sheep intestines. It was similar to that of strings for violins, guitars, and tennis racquets. A great change in suturing technique was then introduced, after endorsing the routine sterilization of all suture threads.[2] Despite the sophistication of today's suture materials and surgical techniques, closing a wound still involves the same basic procedure used by the physicians of the Roman emperors. The surgeon still uses a surgical needle to penetrate tissue and advances a suture strand to its desired location. Development of good technique requires knowledge and understanding of the rational mechanics

involved in suturing. Many experienced investigators, even those who have performed surgeries for many years, have developed poor surgical technique.[3] The word "code" is defined as a rule for converting a piece of information (for example, a letter, a word, a phrase, or a gesture) from one form into another (one sign into another sign), not necessarily of the same type. In communications and information, processing or encoding is the process by which information from a source is converted into symbols to be communicated. Decoding is the reverse process: converting these code symbols back into information understandable by a receiver.[4]

MATERIALS AND METHODS

Coding Method

The method of the coding process depends on fixing guide points on both wound edges to act as a guideline on surface skin or gut (bowl) surface, which helps in practicing suture pattern techniques. The guide points consist of numbers and symbols arranged in a standard manner. The arrangement is fixed as 1-3-5-7 and a-c-e-g on one side, whether right or left, and as 2-4-6-8 and b-d-f-h on the other side (Fig. 1A–C).

There are other types of stitches that surgeons practice inside incisions that involve passing the needle through the skin layers themselves, for example, the subcuticular suture pattern (Fig. 11). In this case, the fixed guide points are arranged as mentioned earlier but perpendicular to the skin edges (Fig. 1D).
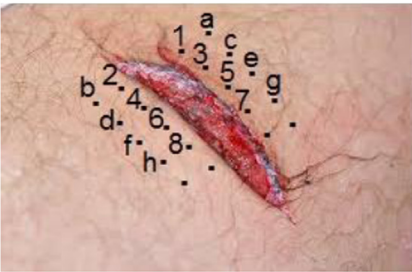
Coding Rules

They are standard rules applied in each suture pattern for the encoding process.

(1, a)

It is the start point, which means that the insertion of the suture needle is from above the surface, such as the simple interrupted suture (Fig. 2).

(1`, a`)

A — Fixed outline on a wound edges.

Wound edge			
Left side		Right side	
b.	2.	.1	.a
d.	4.	.3	.c
f.	6.	.5	.e
h.	8.	.7	.g
.	.	.	.

B — Standard arrangement.

Wound edge					Wound edge					Wound edge			
Left side		Right side			Left side		Right side			Left side		Right side	
h.	8.	.7	.g		g.	7.	.8	.h		a.	1.	.2	.b
f.	6.	.5	.e		e.	5.	.6	.f		c.	3.	.4	.d
d.	4.	.3	.c		c.	3.	.4	.d		e.	5.	.6	.f
b.	2.	.1	.a		a.	1.	.2	.b		g.	7.	.8	.h

C — Another possible arrangement.

	Wound			
	b.	2.	.1	.a
Left side	d.	4.	.3	.c
	f.	6.	.5	.e
	h.	8.	.7	.g
	.	.	.	.

(Right side)

D — Fixed guide points arranged perpendicular to skin edges.

FIGURE 1. (A) Fixed outline on a wound's edges, (B) standard arrangement, (C) another possible arrangement, and (D) fixed guide points arranged perpendicular to skin edges.