

## Enhancing Your Manuscript With Graphic Elements, Part 1: Tables

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In scientific writing, graphic elements have the potential to greatly improve manuscripts by demonstrating trends, showing comparisons, and presenting large amounts of data. When used incorrectly, however, graphic elements can clutter a manuscript or confuse readers. In this second installment in our series on scientific writing,<sup>1,2</sup> I will discuss the best approach to using graphic elements in a manuscript. Because tables and figures each present their own unique challenges, I will discuss each element separately. In part 1 of this topic, I will look at tables, including how to determine whether a table is the best format for your information, how best to organize your table, and how best to prepare each component of your table.

### Do You Need a Table or a Figure?

If authors have information that they would like to present using graphic elements, authors must first decide whether they need a table or a figure. To decide on the best format, authors must consider what level of detail that they would like to show, how they want readers to process the information, and whether they want to present exact values or patterns.<sup>3</sup> In general, tables are best used to help readers locate specific information or exact numbers, whereas figures are best used to show comparisons and patterns.<sup>3,4</sup>

Because the present article focuses on tables, let us consider the specific uses of tables. Lang and Secic<sup>3</sup> describe tables as having the following functions:

- to condense or summarize large amounts of data
- to organize and display data with more clarity and conciseness than words
- to compare values or groups of data
- to make information easier to find and understand
- to facilitate calculations

If authors have identified a need for 1 or more of these functions, a table may be an appropriate means for communicating their information. However, authors must first consider whether the information is best presented in the text of the manuscript. For example, a table typically consists of 3 or more interrelated columns and 3 or more rows.<sup>5</sup> If the data meant for the table will require fewer than 3 columns or rows, it may be more appropriate to present the information in the text.<sup>6</sup> For example, the information in *Table 1* could easily be incorporated into the text of the article:

Of the 24 patients, 12 (50%) were women and 20 (83%) were white.

In this instance, the text version of the information is just as clear as the table and takes up less space.

**Table 1.**  
**Table With Data That Would Be Best Incorporated Into the Text of an Article**

Characteristics	No. (%)
Sex, female	12 (50)
Race, white	20 (83)

**Table 2A.**  
**Table in Which Primary Comparisons Are Presented Vertically**

Outcome	Before Treatment, Mean		After Treatment, Mean	
	VAS Score	Tender Points, No.	VAS Score	Tender Points, No.
OMT Group	7	2	4	1
Sham Treatment Group	8	3	7	2

**Abbreviations:** OMT, osteopathic manipulative treatment; VAS, visual analog scale.

**Table 2B.**  
**Table in Which Primary Comparisons Are Presented Horizontally**

Outcome	Before Treatment, Mean		After Treatment, Mean	
	OMT Group	Sham Treatment Group	OMT Group	Sham Treatment Group
VAS Score	7	8	4	7
Tender Points, No.	2	3	1	2

**Abbreviations:** OMT, osteopathic manipulative treatment; VAS, visual analog scale.

Information may be presented in either the text or a table. If a table is going to simply repeat information that has already been stated in the text, the table is likely not necessary. Of note, authors should use the text of the manuscript to discuss or highlight important findings that are presented in a table.<sup>6</sup> Information in tables must also provide a complete picture for the reader without reference to the text. If the table cannot stand on its own, authors may want to rethink the way in which they present the information.

## How Will Your Readers Use the Table?

Once authors have determined that a table is the best option for presenting their information, they must determine how the information will be organized within the table. Data can be arranged horizontally or vertically. Primary comparisons should be presented horizontally, left to right, when possible.<sup>3,4</sup> Consider *Table 2A*.

The data are logically grouped by “before treatment” and “after treatment.” The left-to-right presentation of the 2 outcome measures (ie, visual analog scale score and number of tender points), however, is not helpful in the interpretation of the table. The primary comparison of interest—the OMT group vs the sham treatment group—is presented vertically, making the comparisons harder to read. *Table 2B* is a better example because the primary comparison is presented horizontally, making it easier for readers to interpret the data in the table.

As previously mentioned, tables are typically best used as a reference for readers. To fulfill this function, tables must be arranged logically. For example, a table that presents data collected over time should be arranged in chronological order, and similar types of data should be grouped together.<sup>4</sup> Authors should include only information that is relevant to the message of the table<sup>3</sup>; readers may not be able to find the information they need if a table is overcrowded.

Table Number and Title

**Table 2.**  
**Baseline Characteristics of Healthy Participants Receiving Cranial Osteopathic Manipulative Treatment and Sham Therapy (N=21)**

Characteristic	Manipulative Technique, Group Mean (SEM) <sup>a</sup>		
	Augmentation Technique	Suppression Technique	Sham Therapy
SaO <sub>2</sub> , %	97.6 (0.18)	97.3 (0.17)	97.5 (0.18)
Heart Rate, beats/min	67 (2)	66 (2)	62 (2)
Blood Pressure, mm Hg			
Systolic	115 (3)	112 (4)	111 (3)
Diastolic	61 (2)	60 (2)	59 (3)
S <sub>CT</sub> O <sub>2</sub> , %			
Left side	65.3 (1.9)	66.0 (2.1)	65.6 (2.1)
Right side	66.8 (2.1)	67.5 (2.1)	67.2 (2.2)

Footnotes

<sup>a</sup> No differences were statistically significant.  
Abbreviations: SaO<sub>2</sub>, systemic arterial oxygen saturation; S<sub>CT</sub>O<sub>2</sub>, cerebral tissue oxygen saturation; SEM, standard error of the mean.

Spanner Heading

Column Headings

Row Headings

Row Subheadings

Field

**Figure.**

Components of a table. Table adapted from Shi X, Rehner S, Prajapati P, Stoll ST, Gamber RG, Downey HF. Effect of cranial osteopathic manipulative medicine on cerebral tissue oxygenation. *J Am Osteopath Assoc.* 2011;111(12):660-666.

## What Do You Include in Your Table?

After deciding how their table should be organized, authors should pay particular attention to the specific components of the table: the column and row headings, the field, the footnotes, and the title (*Figure*).

### Column Headings and Row Headings (Stubs)

Column headings and row headings are the tools that help readers find information. Independent variables are typically included in the row headings; dependent variables are typically included in the columns to the right.<sup>4</sup>

Identifying subgroups within the column and row headings can help readers understand the table and find specific information. Spanner headings can help identify subgroups in column headings, and subheadings (often formatted with an indentation) can help identify subgroups in row headings.<sup>3</sup> Too many subgroups can impair readability; if authors find that they have numerous subgroups within a table, they may want to consider breaking the information into multiple tables. For example, demographic information and clinical information are typically best presented in 2 separate tables.

Column and row headings should include group size(s) and units of measure.<sup>3</sup> If room allows, authors should avoid using abbreviations or acronyms in head-

ings. In addition, the words or phrases in headings should be consistent with the words or phrases in the text. For example, if the text refers to “group 1 and group 2,” use those names in the table headings (not “group A and group B”). It is also helpful for readers if information in the table is presented in the same order as it is in the text.

### Field

The field of a table consists of cells (ie, the points at which the columns and rows intersect) that contain the information being presented. Cells can contain numerals, text, or symbols,<sup>4</sup> but to avoid confusion authors should not use signs and symbols (eg, “+” or “-”) when the information can easily be put into words (eg, “present” or “absent”).<sup>6</sup> Every cell in the table should contain information. If no information is appropriate for the cell, authors should enter “NA” and define it in the footnote (ie, “not applicable” or “not available”) or enter some kind of mark that indicates the cell is empty (eg, ellipses, dash marks).

Each column should contain like information; authors should avoid mixing data with different units of measure.<sup>3</sup> The content of the column should also be aligned according to convention. For most tables, words should be left aligned and numerals should be aligned at the decimal.<sup>5</sup> If all cells in a column contain the same

information, it may be appropriate to delete the column and include the information in a footnote (eg, “all participants were women”).<sup>5</sup>

Authors should provide raw data—not just percentages—in tables. If applicable, authors should include a column for summary statistics. Of note, the difference between the means and the confidence interval are more clinically significant than *P* values and thus may be more helpful to readers.<sup>3</sup>

It is preferable for information in tables to be original. Authors should cite sources for any information that is not original.

### Footnotes

Footnotes should be identified using the preferred style of the journal to which the manuscript is being submitted. *The Journal of the American Osteopathic Association* and *AMA Manual of Style* call for the use of superscript letters in alphabetical order.<sup>4</sup> Each footnote should be called out in the title or text of the table,<sup>5</sup> and each footnote’s letter should be assigned according to the order in which it appears in the table.

Footnotes are used for many purposes: for example, they may explain discrepancies in data (eg, “Percentages do not total 100 because of rounding.”), define abbreviations in the table, or provide statistical results.<sup>4</sup> As a rule of thumb, any text that could appear in parentheses within the table is best placed in the footnotes.

### Title

At this point, authors should have already determined that the information in the table can stand on its own without reference to the text. A title provides context that will help readers interpret information in the table. Consider the following examples:

**Poor title:** Table. Study Outcomes

**Better title:** Table. Outcomes of Osteopathic Manipulative Treatment vs Standard Care in Patients (N=321)

**Still better title:** Table. Main Outcome Measures of Pregnant Woman Receiving Osteopathic Manipulative Treatment vs Standard Care Only (N=321)

The first example is a poor title because provides no information about the study or study participants and thus does not give readers context for the information in the table. The second example is a better title because it describes the intervention used in the study. With this title, however, readers would still need to refer to the body of the article for information on the group of patients or disease being studied. The third example is the preferred title because it provides sufficient information about the study intervention and study participants for the table to stand on its own.

Although authors should be specific in their titles, they should be careful to describe only the topic of the table and avoid describing the results.<sup>4</sup> Table titles should include the table number (if the manuscript contains more than 1 table) and should be presented as phrases instead of full sentences.<sup>4</sup>

## Conclusion

Tables are useful means for authors to communicate large amounts of information to readers, especially information that is complex or data heavy. By carefully considering the function of the table, how readers will use the table, and the purpose of various parts of a table, authors can ensure that their table will act as an effective tool for displaying their findings.

## References

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