

The `palmer` package for drawing Zsigmondy-Palmer dental notation

Yosuke Yamazaki*

September 9, 2025

1 Introduction

This document explains how to use the `palmer` package (v1.0.1), which is designed for typesetting the Zsigmondy-Palmer dental notation in \LaTeX . The package uses `TikZ` to draw the notation.

2 Basic Usage

To use the `palmer` package, include the following command in the preamble:

```
\usepackage{palmer}
```

Syntax:

```
\Palmer[<options>]{<UL>}{<UR>}{<LR>}{<LL>}{<upper midline>}{<lower midline>}
```

2.1 First Argument

The first argument is optional and specifies the vertical alignment. If omitted, the default setting is `base`. The available options are `center`, `base`, and `bottom`, as explained in Section 4.

2.2 Second to Fifth Arguments

These arguments specify the characters to be displayed in each quadrant: upper left (UL), upper right (UR), lower right (LR), and lower left (LL), respectively^{*1}. If no character is to be displayed in a quadrant, leave the corresponding argument empty. However, an error will

* Dept. Anatomy, Nihon University School of Dentistry, Tokyo, Japan

^{*1} Note that “left” and “right” here refer to the notation’s visual representation, not the anatomical left and right of the jaw.

occur if all four quadrant arguments are empty.

For the second (upper left) and fifth (lower left) arguments, characters should be entered from mesial to distal (in natural reading order). The macro automatically reverses this input to display the characters from distal to mesial, following standard dental charting conventions.

This package is intended for use with numbers 1 to 8 and letters A to E. While other characters may work, they are not officially supported and could result in layout issues.

2.3 Sixth and Seventh Arguments

These arguments specify the characters to be displayed at the upper and lower midline positions, respectively. If no character is to be displayed, the argument may be left empty.





The package is designed primarily for single characters at midline positions. Using multiple characters may cause layout problems.

Additionally, these arguments accept the special keyword **novert**, which suppresses the vertical midline. This is useful for representing either the upper or lower jaw without distinguishing between left and right sides. The **novert** keyword has the same effect whether placed in the sixth or seventh argument.

3 Examples

3.1 Single Tooth or Single Quadrant Notation

The following examples illustrate how to denote individual teeth using the Zsigmondy-Palmer notation:

Syntax	Result
<code>\Palmer{1}{ }{ }{ }{ }</code>	
<code>\Palmer{ }{C}{ }{ }{ }</code>	
<code>\Palmer{ }{ }{ }{45}{ }</code>	
<code>\Palmer{ }{ }{1--3}{ }{ }</code>	

3.2 Upper or Lower Jaw Representation

To represent either the upper or lower jaw, use the following syntax:

In the third example, `\hspace{3em}` is used to create an empty quadrant.

Syntax	Result
<code>\Palmer{12}{12}{ }{ }{ }</code>	$\begin{array}{c c} 21 & 12 \\ \hline \end{array}$
<code>\Palmer{ }{ }{45}{45}{ }{ }</code>	$\begin{array}{c c} 54 & 45 \\ \hline \end{array}$
<code>\Palmer{ }{ }{\hspace{3em}}{ABC}{ }{ }</code>	$\begin{array}{c c} CBA & \\ \hline \end{array}$

3.3 Left or Right Half Representation

To represent the upper and lower teeth on either the left or right side, use the following syntax:

Syntax	Result
<code>\Palmer{ }{12}{34}{ }{ }{ }</code>	$\begin{array}{c c} & 12 \\ \hline & 34 \end{array}$
<code>\Palmer{4--6}{ }{ }{3--6}{ }{ }</code>	$\begin{array}{c c} 6-4 & \\ \hline 6-3 & \end{array}$
<code>\Palmer{ }{ }{ }{3}{ }{ }{ }</code>	$\begin{array}{c c} & \\ \hline & 3 \end{array}$

In the third example, a space is used in the argument to create an empty quadrant.

3.4 Full-Mouth Representation

To represent the entire dentition:

Syntax	Result
<code>\Palmer{4}{4}{5}{5}{ }{ }</code>	$\begin{array}{c c} 4 & 4 \\ \hline 5 & 5 \end{array}$
<code>\Palmer{A}{ }{A}{ }{ }{ }</code>	$\begin{array}{c c} A & \\ \hline & A \end{array}$
<code>\Palmer{6}{ }{ }{ }{ }{ }{ }</code>	$\begin{array}{c c} 6 & \\ \hline & \end{array}$

As in previous examples, an empty quadrant can be created by including a space or using a command like `\hspace{ }`.

3.5 Upper or Lower Jaw Without Side Distinction

To represent an upper or lower jaw without distinguishing left from right, use the **novert** in the sixth or seventh argument. This suppresses the vertical line.

Syntax	Result
<code>\Palmer{3}{ }{}{}{novert}{ }</code>	<u>3</u>
<code>\Palmer{}{}{A}{ }{}{novert}</code>	<u>A</u>

The **novert** keyword can be placed in either the sixth or seventh argument with the same effect. When using **novert** for the upper jaw, teeth numbers can be entered in either the second argument (upper left quadrant) or the third argument (upper right quadrant). Similarly, for the lower jaw, teeth numbers can be entered in either the fourth argument (lower right quadrant) or the fifth argument (lower left quadrant).

3.6 Midline Symbol Placement

Symbols can be placed at the midline positions.

Syntax	Result
<code>\Palmer{3}{3}{ }{}{\textasciitilde}{ }</code>	<u>3 3</u>
<code>\Palmer{}{}{1}{1}{ }{}{\bigcirc}</code>	<u>1 ⊙ 1</u>

In clinical practice in Japan, symbols are sometimes placed at the midline for patient records and dental charts. The following Unicode symbols can be used to achieve optimal results: △ (U+25B3), ○ (U+25CB), ∼ (U+301C).

4 Adjustment of Vertical Position in Inline Text

This section explains the first, optional argument of the `\Palmer` command, which controls the vertical alignment of the notation within a line of text.

The `palmer` package can typeset Zsigmondy-Palmer dental notation not only as standalone elements but also inline within running text. The vertical position options ensure proper alignment with the surrounding text. It is important to note that the vertical positioning of the dental notation can also affect the line spacing, especially for notations that span both the upper and lower jaws. If you wish to reduce the line spacing, using font size commands such as `\small` or `\tiny` for the notation will likely yield good results.

4.1 option: base

This is the default value. If notation spans both upper and lower jaws, the baseline of the lower jaw text is aligned with the line's baseline. For other cases, the baseline of the text within the notation is aligned with the line's baseline.

Example:

$$\begin{array}{ccccccc} \text{Lorem} & \overline{1} & \text{ipsum} & \overline{4} & \text{dolor} & \overline{1} & \overline{1} & \text{sit} & \overline{A} & \overline{A} & \text{amet, consectetur adipiscing elit.} \\ & \overline{4} & & \overline{5} & & \overline{1} & \overline{1} & & & & \\ \text{Ut} & \overline{4} & \text{purus} & \overline{5} & \text{elit} & \overline{1} & \overline{1} & , & \text{vestibulum ut, placerat ac, adipiscing vitae, felis.} \end{array}$$

4.2 option: center

`centre` is also accepted. If the notation spans both upper and lower jaws, the horizontal line of the notation is centered vertically with respect to the line of text (specifically, the mean line or the x-height). In other cases, this option behaves identically to the `base` option.

Example:

$$\begin{array}{ccccccc} \text{Lorem} & \overline{1} & \text{ipsum} & \overline{4} & \text{dolor} & \overline{1} & \overline{1} & \text{sit} & \overline{A} & \overline{A} & \text{amet, consectetur adipiscing elit.} \\ & \overline{4} & & \overline{5} & & \overline{1} & \overline{1} & & & & \\ \text{Ut} & \overline{4} & \text{purus} & \overline{5} & \text{elit} & \overline{1} & \overline{1} & , & \text{vestibulum ut, placerat ac, adipiscing vitae, felis.} \end{array}$$

4.3 option: bottom

The bottom edge of the notation's bracket is aligned with the line's baseline. This applies to all notation types.

Example:

$$\begin{array}{ccccccc} \text{Lorem} & \overline{1} & \text{ipsum} & \overline{4} & \text{dolor} & \overline{1} & \overline{1} & \text{sit} & \overline{A} & \overline{A} & \text{amet, consectetur adipiscing elit.} \\ & \overline{4} & & \overline{5} & & \overline{1} & \overline{1} & & & & \\ \text{Ut} & \overline{4} & \text{purus} & \overline{5} & \text{elit} & \overline{1} & \overline{1} & , & \text{vestibulum ut, placerat ac, adipiscing vitae, felis.} \end{array}$$

5 Application Examples

Syntax	Result
<code>\color{red} \Palmer{}{}{123}{123}{}{}</code>	$\overline{321 \mid 123}$
<code>\Palmer{}{}{\textcircled{4} 5 \textcircled{6}}{}{}{}</code>	$\overline{\textcircled{4} 5 \textcircled{6}}$
<code>\Palmer{3}{3}{1 \bigcirc 3}{12 \textcircled{3}}{\sim}{\triangle}</code>	$\begin{array}{r} 3 \sim 3 \\ \hline \textcircled{3} 21 \triangle 1 \bigcirc 3 \end{array}$
<code>\LARGE \Palmer{123}{123}{123}{123}{}{}</code>	$\begin{array}{r l} 321 & 123 \\ \hline 321 & 123 \end{array}$

Symbols enclosed in circles, commonly used in clinical practice in Japan, can be effectively represented using the following symbols: ① (U+2461) or Ⓐ (U+24B6).

Alternatively, they can also be drawn using *TikZ*, as shown in the table below.

Syntax	Result
<code>\tikz[baseline=(char.south)] \node[shape=circle,draw,inner sep=0.7pt] (char) {\scriptsize 1};</code>	①
<code>\tikz[baseline=(char.south)] \node[draw, shape=circle, double, inner sep=1pt] (char) {\scriptsize 6};</code>	Ⓔ
<code>\tikz[baseline=(char.south)] \node[shape=regular polygon, regular polygon sides=3,draw,inner sep=0.1pt] (char) {\scriptsize 3};</code>	$\triangle 3$

6 Important Note on Package Loading Order

The `palmer` package relies on *TikZ* to draw its graphical elements. The *TikZ* package is powerful and interacts with L^AT_EX's low-level page building mechanism, known as the shipout routine.

Other L^AT_EX packages that also modify the page layout—for example, to add watermarks, background images, or marginalia—may interact with this same mechanism. The order in

which these packages are loaded determines the final behavior of the page layout.

If you use `palmer` alongside another package that performs complex modifications to the page layout, a conflict may arise depending on the loading order.

For instance, when using the `thumbs` package to create thumb indexes, `palmer` must be loaded after it.