Mosaic plots to show relationship of categorical features to 'Cormack Lehane'.
Read below about chi square test of independence

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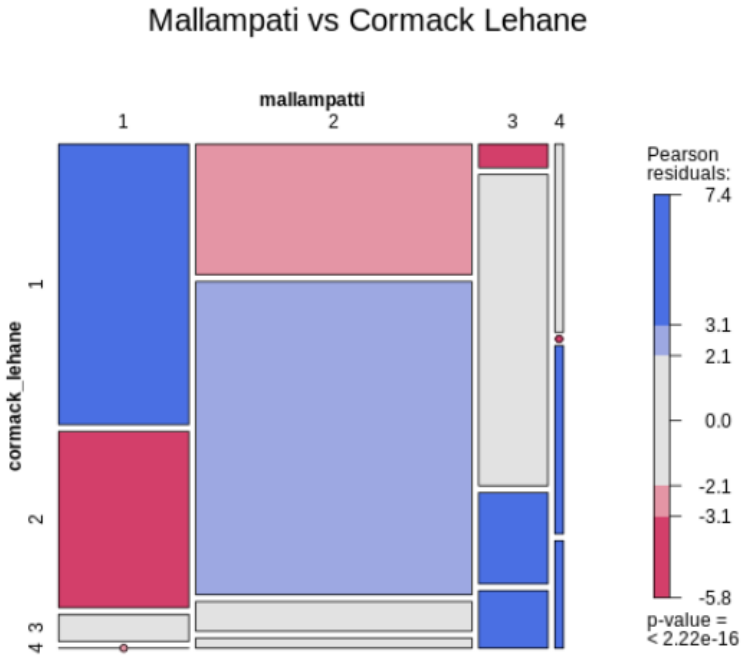
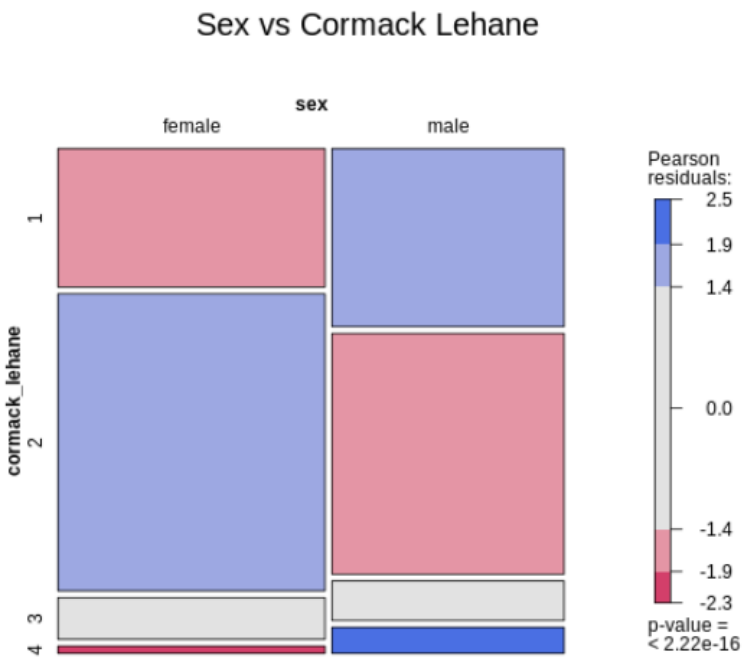
How to interpret Mosaic plots—See here and also See here

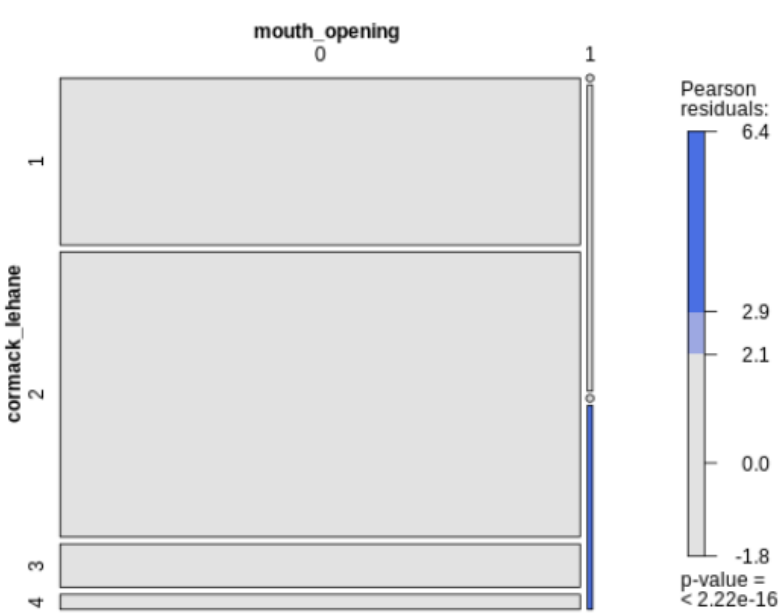
Mallampati vs Cormack Lehane: Squares (or rather rectangles) and intensity of colours within them show, there is a very strong relationship between Mallampati and Cormack Lehane. chi square test of independence and the corresponding p-value support this. It can also be seen (compare vertical depth) that those with mallampati score of 1 have a higher probability of having Cormack Lehane score of 1 and those with mallampati score of 2 have a higher probability of having Cormack Lehane of 2. And similar conclusion holds for mallampati scire of 3,

Sex and Cormack Lehane: When compared to males, females have a higher proportion of Cormack Lehane score of 2. Relationship between sex and Cormack Lehane is also strong though not as strong as that between mallampati and Cormack Lehane.

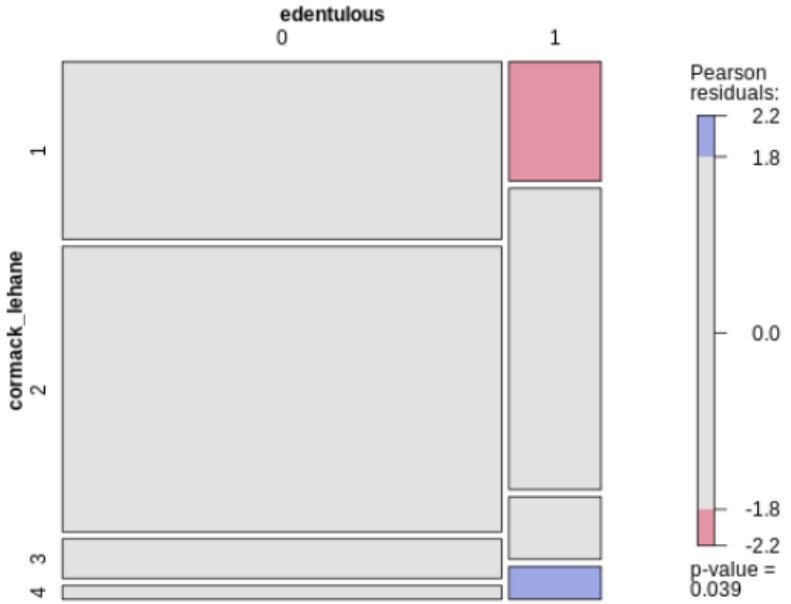




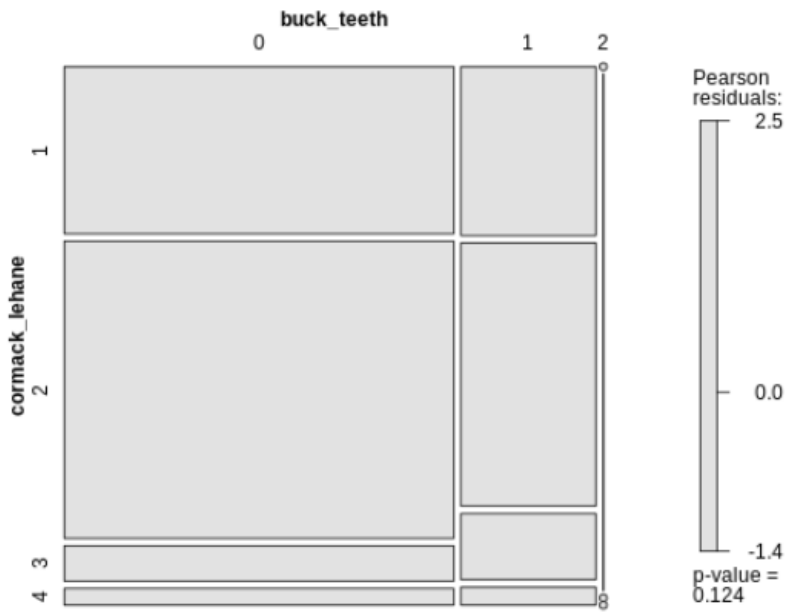
mouth opening vs Cormack Lehane



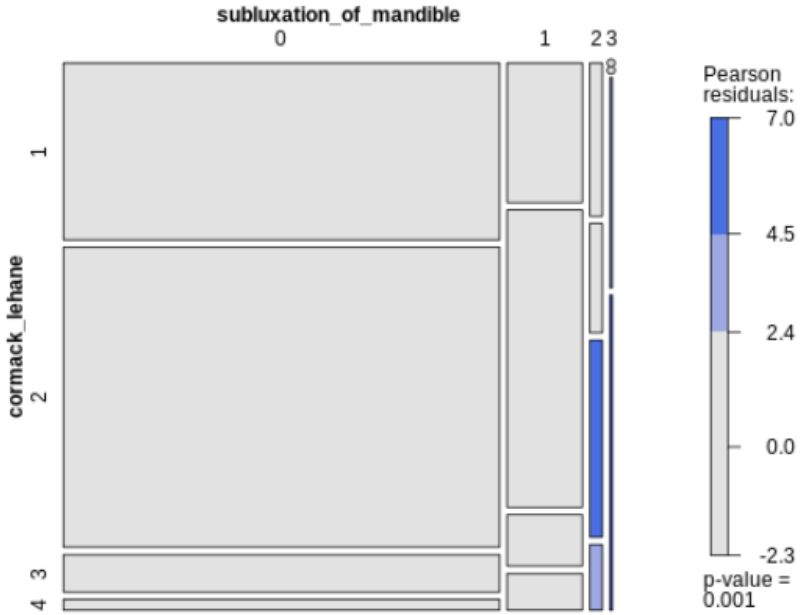
edentulous vs Cormack Lehane



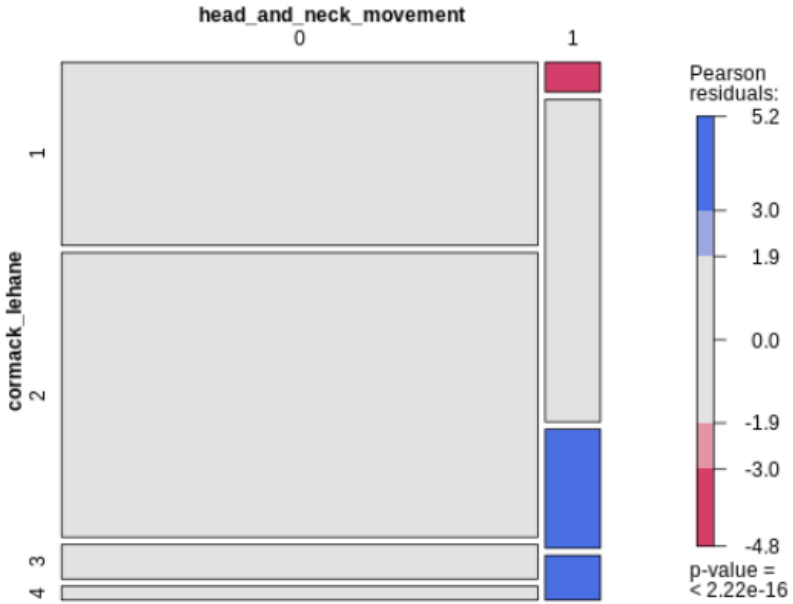
buck_teeth vs Cormack Lehane



subluxation_of_mandible vs Cormack Lehane

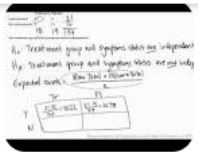


head_and_neck_movement vs Cormack Lehane



About chi square test of independence

The Chi-square test of independence is **a statistical test used to determine if there's a relationship between two categorical variables**. It checks if the observed frequencies in a contingency table significantly differ from what's expected if the variables were independent.



Key Concepts:

Categorical Variables:

The variables being tested must be categorical (e.g., gender, political affiliation, yes/no responses).

Contingency Table:

The data is organized into a table where rows and columns represent the categories of the two variables.

Observed vs. Expected Frequencies:

The test compares the actual number of observations in each cell of the table (observed frequencies) to the expected number if the variables were independent (expected frequencies).

Chi-square Statistic:

A test statistic (X^2) is calculated based on the difference between observed and expected frequencies.

P-value:

The p-value is calculated to determine the probability of observing the data (or more extreme data) if the variables were truly independent.

Null Hypothesis:

The null hypothesis states that the two variables are independent.

Alternative Hypothesis:

The alternative hypothesis states that the two variables are not independent (i.e., there's a relationship).

How it Works:

1. **Formulate Hypotheses:** Define the null and alternative hypotheses.
2. **Collect Data:** Gather data for the two categorical variables and organize it into a contingency table.
3. **Calculate Expected Frequencies:** Determine what the expected frequencies would be if the variables were independent.

4. **Calculate the Chi-square Statistic:** Compute the chi-square statistic (X^2) using the formula:

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X² = Σ [(Observed - Expected)² / Expected]
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where the summation is over all cells in the contingency table.

1. Determine Degrees of Freedom:

The degrees of freedom (df) are calculated as (number of rows - 1) * (number of columns - 1).

2. Calculate the P-value:

Use the chi-square distribution with the calculated degrees of freedom to find the p-value.

3. Make a Decision:

Compare the p-value to the significance level (alpha, often 0.05). If the p-value is less than or equal to alpha, reject the null hypothesis and conclude that there's a statistically significant relationship between the variables.

Example:

Imagine you're studying the relationship between gender (male/female) and political affiliation (Democrat, Republican, Independent). You collect data from a sample and create a contingency table. You calculate the expected frequencies for each cell assuming gender and political affiliation are independent. You then calculate the chi-square statistic and p-value. If the p-value is small, you can conclude that there's evidence of a relationship between gender and political affiliation.

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