

## はじめに

本書は、CLIL (Content and Language Integrated Learning) (内容と言語を統合した学習) という教育理念を基盤として構成されています。内容 (題材) として human biology (人間生物) を扱い、その学びを通して英語の力をつけることを意図しています。つまり、内容 (content) に関連して思考 (cognition) しながら、学習者同士で英語を使うことでコミュニケーション能力 (communication) を高め、多様な社会で生活していく上での知識や技能 (culture) を学びます。

本書の内容に関しては、フランスで CLIL 指導の資格を持ち、英語で生物を教えている Suzanne Dijon のアドバイスを受けています。人間が生きていく上で必要な身体のしくみや働きだけでなく、その環境を含めて学ぶことを想定しています。

授業では、基本的に TASK の指示に従って活動することで学習を進められるようになっています。「問題に答える」ことだけに終始せず、「英語を使う」「英語でコミュニケーションする」「人間や生物について考える」「自分が興味のあることを自分で調べる」といったことを意識しながら、本書を利用するようにしてください。

次のような点に留意しながら、CLIL で学んでください。

- 目標をしっかりと持ち、学ぶ内容に興味を持つ
- 学び、生活する上で実際に使える英語を学ぶ
- 日本語に訳すことにこだわらず、英語で意味を理解する
- 自分の持っている知識を使って推測する
- 英語の誤りを気にしないで、意味を伝える
- 互いに協力して教え合い・学び合う環境を大切にする
- 英語は、使いながら覚える
- 興味のあることは自分で調べる
- わからないことは遠慮しないで質問する
- 学んだことで大切なことは整理してまとめておく
- 学ぶことを楽しむ

著者一同

## 本教科書を使った学習展開について

CLIL で大切な点は、「為すことによって学ぶ (learning by doing)」ということです。教科書で使われている表現を理解し覚えるという学習ではなく、「英語を使って、考えて、コミュニケーションして、学習を発展させる」という活動の中での学習を重視します。Human biology (人間生物) に関する知識や思考を発展させることを目標に授業に参加しましょう。その際に CEFR の 6 レベルを使うとよいでしょう。目安は次のとおりです。詳しくはウェブなどで公開されている CEFR の自己評価表を見てください。

**C2** (英語を母語として使うレベル)

**C1** (英検 1 級レベル、日本人学習者が最終的に目指すレベル)

**B2** (英検準 1 級レベル、仕事や学習などで英語が使える大学卒業レベル)

**B1** (英検 2 級レベル、日常的に英語が使える大学生レベル)

**A2** (英検 3 級レベル、慣れた状況ではふつうに英語が使える高校生レベル)

**A1** (中学生レベル、基本的な英語が使える初学者レベル)

### あなたの到達目標レベル設定

聞く	読む	話す (発表)	話す (会話)	書く

### それぞれのセクションの活動についての指針

- 1 Check your knowledge** (基礎知識を確認する) **TASK 1** **TASK 2**  
答えを求めるのではなく、質問をもとに考えましょう。
- 2 Listening to talks** (聞く) **TASK 3**  
日本語の意味にこだわらず、聞いて、内容に興味を持ちましょう。
- 3 Questions and discussion about the talks** (考える) **TASK 4** **TASK 5**  
2 の内容について考え、話し合いましょう。
- 4 Reading Part 1 / Part 2** (読む) **TASK 6** **TASK 7**  
日本語に訳すのではなく、KWL 表を作成して学びましょう。
- 5 Language use** (英語の使い方を確認する) **TASK 8** **TASK 9**  
英語を使うことを考えて、文法を整理しましょう。
- 6 Further study** (学習を発展する) **TASK 10**  
各ユニットの内容について発展的に活動しましょう。

### 授業中の言語使用について：

無理をせず英語を協力して使いましょう。また、英語と日本語の両方を自然に使うことをこころがけましょう。大切なことは、意味のやりとりです。

## How to make a KWL Chart (作成のしかた)

**4 Reading** High School Sports Injuries

**Part 1 Which sport do you like? What should you do when you are injured?**

Every year lots of teenagers participate in high school sports. An injury to a high school athlete can be a significant disappointment for them and their family. If they continue to play with an injury, it may lead to an additional injury with long-term effects. High school sports injuries can cause problems that require surgery as an adult.

The figure shows the severity of injuries occurred among US high school student athletes in football, soccer, volleyball, basketball, wrestling, baseball and softball. The injuries were measured by days lost from play and varied by sports. Overall, approximately half of the injuries resulted in less than 7 days lost, and football, girls' basketball, and wrestling had greater proportions of injuries resulting in more than 7 days lost. The overall injury rate in all sports combined was 2.44 injuries per 1,000 athlete exposures.

When you have a sports injury, ensure the best possible recovery by returning to the game.

**Figure** Proportion of injuries, by sport and number of days lost — High School Sports-Related Injury Surveillance Study, United States, 2005-06 school year

**Table** Sports-specific injury rates\* in practice, competition, and overall — High School Sports-Related Injury Surveillance Study, United States, 2005-06 school year

Sport	Practice	Competition	Overall
Boy's football	2.54	12.09	4.36
Boy's wrestling	2.54	3.93	2.30
Boy's soccer	1.58	4.22	2.43
Boy's basketball	1.10	5.21	2.36
Girl's basketball	1.37	3.60	2.01
Girl's volleyball	1.46	2.86	1.69
Girl's softball	1.48	1.92	1.64
Boy's baseball	0.97	1.37	1.19
Girl's softball	0.79	1.29	1.13
Total	1.69	4.63	2.44

\*Per 1,000 athlete exposures (i.e., practice or competition).

**Task 6 Create a KWL Chart in your notebook**

Topic	What I know
Language	
Content	

### What I know

(このトピックについてすでに知っていること)

- **Language (英語)**  
たとえば、ここでは sports の名称やけがの言い方など
- **Content (内容)**  
たとえば、ここでは、突き指、捻挫、打撲など自分や友人のけがの経験など

### What I want to know (知りたいこと)

- **Language (英語)**  
たとえば、けがに関するどのような英語表現があるのか、など
- **Content (内容)**  
たとえば、どのようなスポーツにどのようなけがが多いのか、けがをしないようにするにはどうしたらよいのか、など

### What I learned (ここで学んだこと)

- **Language (英語)**  
学んだ英語表現を整理する。  
a significant disappointment (重大な失望)、long-term effects (長期の影響) など
- **Content (内容)**  
アメリカの高校生のスポーツのけがの状況など、特に女子バスケットボール競技のけがの数。スポーツをする上では、けがをしない工夫、治療などのガイドラインを理解することが重要だ、など

## Task 6 Create a KWL Chart in your notebook. 例 (ノートにまとめる)

Topic	What I know [知っていることをまとめる]	What I want to know [知りたいことを自分で調べる]	What I learned [学んだことをまとめる]
Language	teenagers 十代の人 athlete 運動選手 high school sports 高校スポーツ football アメリカンフットボール soccer サッカー volleyball バレーボール basketball バスケットボール wrestling レスリング baseball 野球 ...	sports injuries 例) sprains and strains 捻挫 knee injuries 膝のけが swollen muscles 筋肉の腫れ Achilles tendon injuries アキレス腱のけが pain along the shin bone 脛骨の痛み fractures 骨折 dislocations 脱臼	participate in 参加する a significant disappointment 重大な失望 injury けが additional 追加の long-term effects 長期の影響 figure 図 approximately 約 proportion 割合 result in (結果として)〜になる ...
Content	<ul style="list-style-type: none"> <li>日本の高校の運動部の部活動(野球、サッカーなど)の経験</li> <li>自分や友達のけがの経験(けがの種類と場所など)</li> <li>治療やリハビリの経験(どのくらいの期間で治ったか、障害や傷は残ったか)</li> </ul> (英語でまとめるのもよい)	<ul style="list-style-type: none"> <li>アメリカと日本のスポーツ文化の違い</li> <li>高校スポーツの実態</li> <li>スポーツのけがの関係</li> <li>スポーツによるけがと治療</li> <li>クラスのそれぞれの実体験を知りたい</li> </ul> (英語でまとめるのもよい)	アメリカの高校スポーツによるけがの発生件数や治療にかかる日数など。 女子バスケットボールのけがが長期の影響を受けるということが興味深い。 (英語でまとめるのもよい)

<b>UNIT 1</b>	<b>Sports and injuries</b> 運動とけが ..... 8
	Listening to talks: <b>The Human Body</b>
	Reading: <b>High School Sports Injuries</b>
	Language use: <b>AUXILIARY VERBS</b> 助動詞
	Further study: <b>Sports Injuries</b>
<b>UNIT 2</b>	<b>Blood circulation</b> 血液と血流 ..... 16
	Listening to talks: <b>Blood</b>
	Reading: <b>Exercises for Better Blood Circulation</b>
	Language use: <b>NOUNS</b> 名詞
	Further study: <b>Blood Pressure</b>
<b>UNIT 3</b>	<b>Muscles and movement</b> 筋肉と運動 ..... 24
	Listening to talks: <b>Muscles</b>
	Reading: <b>Voluntary Muscles</b>
	Language use: <b>TRANSITION WORDS</b> つなぎの語句
	Further study: <b>Muscles and Movement</b>
<b>UNIT 4</b>	<b>Genetically modified (GM) food</b> 遺伝子組み換え食品 ..... 32
	Listening to talks: <b>Different Ideas about GM Food</b>
	Reading: <b>Labeling GM Food</b>
	Language use: <b>PHRASAL VERBS</b> 句動詞
	Further study: <b>Food and Labeling</b>
<b>UNIT 5</b>	<b>The brain: language and sleep</b> 脳：言語と睡眠 ..... 40
	Listening to talks: <b>Things Affect the Brain</b>
	Reading: <b>Stages of Sleep</b>
	Language use: <b>TOO &amp; ENOUGH</b> 副詞と形容詞
	Further study: <b>Your Brain</b>
<b>UNIT 6</b>	<b>Animals and humans</b> 動物と人間 ..... 48
	Listening to talks: <b>How Animals Benefit Human Health</b>
	Reading: <b>Zoonosis</b>
	Language use: <b>WHEN &amp; IF</b> 接続詞
	Further study: <b>Deadly Animals</b>
<b>UNIT 7</b>	<b>Agriculture and human health</b> 農業と健康 ..... 56
	Listening to talks: <b>Agriculture and Human Life</b>
	Reading: <b>Freshwater</b>
	Language use: <b>BECAUSE &amp; SO</b> 原因、理由、結果
	Further study: <b>Meat Consumption</b>

## UNIT

8

**Health and fitness** 健康と運動 ..... 64

Listening to talks: **Benefits of Exercise**  
 Reading: **Exercises**  
 Language use: **COMPARATIVES** 比較  
 Further study: **Advantages and Disadvantages of Exercise**

## UNIT

9

**Food and nutrition** 食事と栄養 ..... 72

Listening to talks: **Six Major Nutrients**  
 Reading: **Healthy Eating Pyramid**  
 Language use: **RELATIVE CLAUSES** 関係詞  
 Further study: **Food and Nutrients**

## UNIT

10

**Drugs and human body** 薬と身体への影響 ..... 80

Listening to talks: **The Advantages and Disadvantages of Drugs**  
 Reading: **Aspirin**  
 Language use: **PASSIVE VOICE** 受動態  
 Further study: **Side Effects of Drugs**

## UNIT

11

**Human immunity** 免疫 ..... 88

Listening to talks: **Human Immunity**  
 Reading: **Boosting Your Immune System**  
 Language use: **SIMPLE PRESENT TENSE** 単純現在時制  
 Further study: **Flu Prevention**

## UNIT

12

**Humans and their environments** 人間と環境 ..... 96

Listening to talks: **Humans and Their Environments**  
 Reading: **Colors in Our Home**  
 Language use: **ADJECTIVES** 形容詞  
 Further study: **Humans and Their Environments**

## UNIT

13

**Food issues and human health** 食料問題と健康 ..... 104

Listening to talks: **Food Problems**  
 Reading: **Hunger**  
 Language use: **PARTICIPLES** 分詞  
 Further study: **Food Issues**

## UNIT

14

**Genetics** 遺伝 ..... 112

Listening to talks: **Hereditary Traits**  
 Reading: **DNA Evidence**  
 Language use: **INFINITIVES** 不定詞  
 Further study: **Observable Inherited Traits**

**Glossary** ..... 120

# Sports and injuries

■ 運動とけが



## 1 Check your knowledge

**Task 1** Try to answer the questions by looking at the pictures.

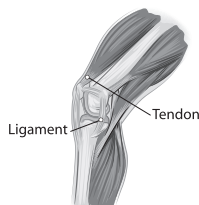
**Q1** What type of injury leads to the most emergency room visits?

- a) Broken bones.
- b) Sprains and strains.
- c) Bumps and bruises.
- d) Cuts and abrasions.



**Q2** A sprain is an injury to which of the following?

- a) A ligament.
- b) A tendon.
- c) A muscle.
- d) A bone.



**Task 2** Share ideas with your classmates.

**Q** Have you had any sports injuries? What kind? How did they happen? Where? When?

*e.g. I have broken my left leg once. I broke it when I was playing football 3 years ago.*





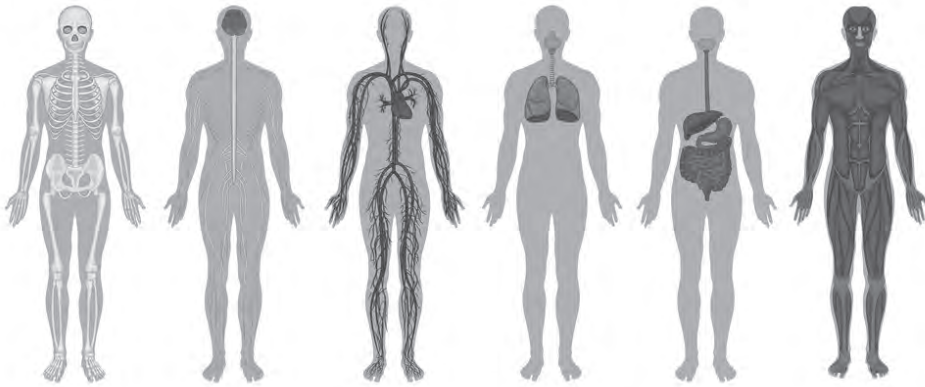
## 2

## Listening to talks

## The Human Body

**Task 3** Listen to talks about the human body.

- First, fill in the missing words.
- Second, check the true or false statements with your classmates. If you aren't sure, give reasons for your answer.



CD1-1



001

- 1 Our human body is a complex system.** It still confuses (<sup>1</sup> ) on a regular basis despite thousands of years of medical (<sup>2</sup> ). You don't need to be surprised that our body parts and (<sup>3</sup> ) have many unexpected facts and explanations behind them. There are lots of interesting facts about the human body. I will show you some.

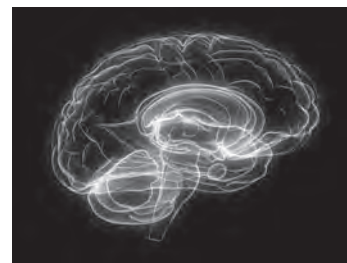
**True or False?** The human body is a system that we can explain easily.

CD1-2



002

- 2 Do you know the brain can't feel pain?** Of course, the brain might be the pain center. When you cut your (<sup>1</sup> ) or burn yourself, you feel pain. But the brain itself does not have pain receptors and can't feel pain. It doesn't mean your head can't (<sup>2</sup> ). The brain is surrounded by lots of tissues, nerves and blood vessels. They are very receptive to pain and sometimes can give you a (<sup>3</sup> ).



**True or False?** The brain is the pain center, so it can feel pain through tissues, nerves and blood vessels around it.

CD1-3  
003

- 3 **Women's hair is finer than men's, but it's still tough.** It is about (<sup>1</sup> ) the diameter of men's hair. You might think it strange, but you wouldn't be surprised to hear that (<sup>2</sup> ) hair is rougher or coarser than (<sup>3</sup> ) hair. In addition, human hair varies in diameter between races.



**True or False?** Human hair is different between genders as well as between races.

CD1-4  
004

- 4 **The largest internal organ is the small intestine.** It is called the (<sup>1</sup> ) of the two intestines, but it is actually four times as long as the (<sup>2</sup> ) of an average adult. If it weren't looped back and forth upon itself, it wouldn't fit (<sup>3</sup> ) the abdominal cavity.



**True or False?** The small intestine is smaller than the large intestine.

CD1-5  
005

- 5 **The aorta, the main artery in the human body, is nearly the diameter of a garden hose.** The average adult (<sup>1</sup> ) is about the size of a fist, beating about (<sup>2</sup> ) times a day. The artery needs to be large, because it is the main supplier of rich, oxygenated (<sup>3</sup> ) to the rest of the body.



**True or False?** The size of your heart is about the size of your fist.

CD1-6  
006

- 6 **Sneezes regularly exceed 100 mph.** They are very powerful, so you can't keep your (<sup>1</sup> ) open when you sneeze. This is also a good reason to cover your (<sup>2</sup> ) when you sneeze. Coughs clock in at about 60 mph. Viruses get spread quickly during cold and flu season. It's no wonder (<sup>3</sup> ) spray germs far and wide.



**True or False?** Sneezes and coughs can spread cold and flu viruses quickly.

\*mph=miles per hour





## 3

## Questions and discussion about the talks

**Task 4** What is the most interesting topic to you? Ask your classmates, using the sample questions below.

1. Which topic are you interested in? Why?
2. Do you think that our body is a complex system? Why do you think so?
3. Do you believe your brain cannot feel pain? When do you feel pain? What kind of pain is the most painful for you?
4. Please compare your own hair with your classmates' hair. What is the difference? Is it true that women's hair is about half the diameter of men's hair?
5. How many organs can you say in English? Share as many as you can with your classmates. Do you know about the organs' functions? Do you have any questions about any of the organs?
6. Try to sneeze and check the speed. Can you keep your eyes open when sneezing?

**Task 5** Take notes and summarize what your classmates say. If you have time, please report your results to the class.

*e.g.* I talked with A. A is interested in the brain. He is surprised that the brain doesn't feel pain. I agreed with him, so we checked the brain's function on the Internet. We found several webpages. The Internet said the brain is not in itself a sensory organ, but gathers messages from sensory organs such as the eyes and skin. We have sensory nerves all around the brain, so you can get headaches. The nerves serve an important purpose to monitor the space around the brain and to cover the brain.

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## 4

## Reading

## High School Sports Injuries

CD1-7



007

## Part 1 Which sport do you like? What should you do when you are injured?

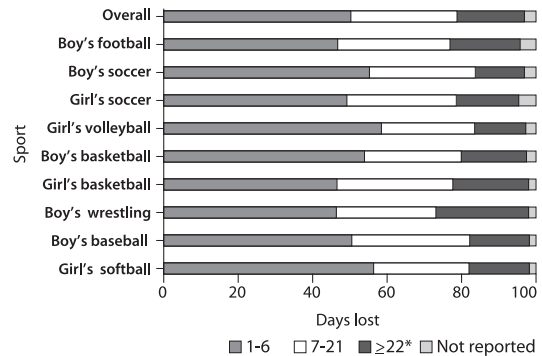
Every year lots of teenagers participate in high school sports. An injury to a high school athlete can be a significant disappointment for them and their family. If they continue to play with an injury, it may lead to an additional injury with long-term effects. High school sports injuries can cause problems that require surgery as an adult.

The figure shows the severity of injuries occurred among US high school student athletes in football, soccer, volleyball, basketball, wrestling, baseball and softball. The injuries were measured by days lost from play and varied by sports. Overall, approximately half of the injuries resulted in less than 7 days lost, and football, girls' basketball, and wrestling had greater proportions of injuries resulting in more than 7 days lost. The overall injury rate in all sports combined was 2.44 injuries per 1,000 athlete exposures (see Table).

When you have a sports injury, you should quickly seek proper treatment. To ensure the best possible recovery, you must follow safe guidelines before returning to the game.

Figure

Proportion of injuries, by sport and number of days lost — High School Sports-Related Injury Surveillance Study, United States, 2005-06 school year



\*Includes athletes who returned to their teams after ≥22 days and athletes who were out for the remainder of the season as a result of their injuries.

Table

Sport-specific injury rates\* in practice, competition, and overall — High School Sports-Related Injury Surveillance Study, United States, 2005-06 school year

Sport	Rate		
	Practice	Competition	Overall
Boy's football	2.54	12.09	4.36
Boy's wrestling	2.04	3.93	2.50
Boy's soccer	1.58	4.22	2.43
Girl's soccer	1.10	5.21	2.36
Girl's basketball	1.37	3.60	2.01
Boy's basketball	1.46	2.98	1.89
Girl's volleyball	1.48	1.92	1.64
Boy's baseball	0.87	1.77	1.19
Girl's softball	0.79	1.78	1.13
Total	1.69	4.63	2.44

\*Per 1,000 athlete exposures (i.e., practice or competitions).

## Task 6 Create a KWL Chart in your notebook.

◆表の作成方法はVページ参照

Topic	What I know	What I want to know	What I learned
Language			
Content			



## Part 2 What types of injuries are you most interested in?

### Acute Injuries

Acute injuries are usually the result of a sudden trauma. Examples include collisions with obstacles on the field or between athletes. Common acute injuries among young athletes are contusions (bruises), sprains (a partial or complete tear of a ligament), strains (a partial or complete tear of a muscle or tendon), and fractures.



### Overuse Injuries

Overuse injuries occur gradually over time. When an athletic activity is repeated so often, parts of the body don't have enough time to heal between playing. Overuse injuries can affect muscles, ligaments, tendons, bones, and growth plates. For example, gymnastics and cheerleading are two common activities associated with injuries to the wrist and elbow.



### Catastrophic Sports Injuries

Many sports, especially contact sports, have inherent dangers. Young athletes can have special risks for severe injuries. Even with rigorous training and proper safety equipment, children are at risk for severe injuries to the head and neck with damage to the brain or spinal cord.



### Concussion

Concussions are caused by a bump, blow or jolt to the head or body. It results in the brain moving rapidly back and forth inside the skull. Concussions can happen in any sport or recreational activity.



### Task 7 Create a KWL Chart in your notebook.

◆表の作成方法はVページ参照

Topic	What I know	What I want to know	What I learned
Language			
Content			



## 5 Language use

## AUXILIARY VERBS 助動詞

**Task 8** Think about the use of AUXILIARY VERBS in the highlighted verb phrases. How are they used?

### A

Every year lots of teenagers participate in high school sports. An injury to a high school athlete **can be** a significant disappointment for them and their family. If they continue to play with an injury, it **may lead** to an additional injury with long-term effects. High school sports injuries **can cause** problems that require surgery as an adult, and **may lead** to arthritis later in life. When you have a sports injury, you **should quickly seek** proper treatment. To ensure the best possible recovery, you **must follow** safe guidelines before returning to the game.

### B

Head injuries **may cause** bleeding in the brain tissue and the layers that surround the brain. Symptoms of a head injury **can occur** right away. They develop slowly over several hours or days. Even if the skull is not fractured, the brain **can hit** the inside of the skull and **be bruised**. Though the head **may look** fine, problems **could result** from bleeding or swelling inside the skull.

**Task 9** Write about your health conditions, using CAN, MAY, MUST, WILL, SHOULD, or COULD. If you do sports, refer to them in your talk. If not, mention your favorite sports. Then share ideas with your classmates.

*e.g. I am fine today, but I MAY be tired later, because I practiced tennis yesterday. I WILL have a tennis tournament next week, so I SHOULD practice a lot. I think I COULD win the match and I MUST practice today. Yes, I believe I CAN win.*

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## 6

## Further study

## Sports Injuries

**Research question:** What should you do if you have injuries when doing sports?  
Based on your research, try to find the best answer.

**Task 10** Use the following steps to do research.

- First, pick out some specific sports, such as baseball or tennis.
- Second, ask your friends what injuries they had and how many days it took to recover.
- Third, disseminate the results.

## TIPS

Exercising is good for you, but sometimes you can get injured when you play sports or exercise. Accidents, poor training practices, or improper gear can cause injuries. Some people get hurt because they are not in shape. Not warming up or stretching enough can also lead to injuries.

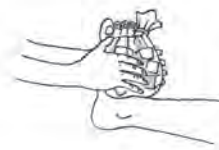
The most common sports injuries are:

- sprains and strains
- Achilles tendon injuries
- rotator cuff injuries
- knee injuries
- pain along the shin bone
- fractures
- swollen muscles
- dislocations

If you get hurt, stop exercising. Continuing to exercise can cause more harm. Treatment often begins with the **RICE (Rest, Ice, Compression, and Elevation)** method to relieve pain, reduce swelling, and speed healing. Other possible treatments include pain relievers, keeping the injured area from moving, rehabilitation, and sometimes surgery.



Rest (安静)



Ice (冷却)



Compression (圧迫)



Elevation (挙上)

**Dissemination plan: Which do you wish to do?**

Report (調査データや事実をまとめて報告)

Essay (論点を決めてまとめる)

Poster presentation (ポスターに図や表を入れてまとめる)

Oral presentation (クラスやグループで発表)

Discussion (話し合う)

Debate (ディベート: 賛成と反対に分かれて論点を明確にして討論する)

