

CyberKnife®

The CyberKnife system uses precisely targeted radiation to destroy cancers and non-cancerous lesions anywhere in the body, including the prostate, lung, brain, spine, liver, pancreas and kidney. Despite its name, the CyberKnife treatment involves no surgery. Instead, CyberKnife is the world's most accurate, real-time, full-body radiosurgery system, using x-ray-guided robotics to deliver focused radiation which painlessly eradicates tumors and lesions with pinpoint precision.

The CyberKnife® system uses an advanced, lightweight linear accelerator (LINAC), mounted on a robotic arm, to deliver an intense focused dose of radiation to the targeted tumor. Hundreds of these tiny, high-energy radiation “beamlets” are delivered from multiple directions. Each beamlet by itself delivers a minuscule amount of radiation. They intersect only on the tumor, where the dose from the beams adds up to deliver the intense focused radiation. Using x-ray - guided cameras, the CyberKnife system locates the exact position of the tumor with surgical precision.

The robotic delivery system integrates motion-tracking software, called the Synchrony System, making it accurate enough to treat a moving target. When a patient breathes or moves during treatment, the robot detects the motion and compensates in 'real time,' ensuring that the radiation is accurately hitting the target with sub-millimeter precision.

With the maneuverability of the robotic arm, surgeons can administer multiple radiation beams from up to 1,200 different targeting positions and angles. All of the beams intersect within the tumor where the total dose is high enough to obliterate the cancer, while minimizing radiation exposure to surrounding healthy tissue.

The CyberKnife has proven to be an effective alternative to surgery or conventional radiation therapy for treating tumors and cancers located anywhere in the body. The CyberKnife offers patients a better quality of life, especially for those with tumors previously diagnosed as 'inoperable,' or those who have already received the maximum amount of radiation through other treatment methods.

<http://www.stfranciscare.org/cyberknife>

Exercises:

I. Read the text and answer the questions.

1. What is the CyberKnife system?
2. What parts does it consist of?
3. What does it use?
4. What are its advantages?
5. How can it treat a moving target?
6. When can it be an alternative to surgery or conventional radiation?

II. Mark the following statements as True (T) or False (F).

1. The CyberKnife System is a non-invasive treatment (= there is no cutting involved) for cancerous and non-cancerous tumors in the body.
2. CyberKnife treatment is very painful.
3. Radiosurgery is a form of radiation therapy that destroys tumors.
4. Radiation is delivered to the target with high accuracy using the CyberKnife system.
5. A moving target can be treated with high precision.
6. The amount of radiation to surrounding healthy tissues is high.

III. Match the words (1-8) with their pronunciation (a-h). Practise pronouncing the words.

- | | |
|--------------|-----------------------|
| 1. lesion | a. /'mɪnɪ,skju:l/ |
| 2. cancerous | b. /ɪ'rædɪkeɪt/ |
| 3. eradicate | c. /'ækjʊrəsi/ |
| 4. minuscule | d. /'tju:mə(r)/ |
| 5. tissue | e. /'kɑns(ə)rəs/ |
| 6. tumor | f. /'li:ʒ(ə)n/ |
| 7. precision | g. /prɪ'sɪʒ(ə)n/ |
| 8. accuracy | h. /'tɪʃu:/ /'tɪʃju:/ |

IV. Match the words (1-10) with their definitions (a- j).

1. beamlet
2. cancerous
3. eradicate
4. intersect
5. lesion
6. minuscule
7. multiple
8. obliterate
9. pinpoint
10. targeted

- a. absolutely precise
 - b. pass or lie across each other
 - c. destroy utterly, wipe out
 - d. involving several parts
 - e. directed at a particular e.g. group
 - f. a small beam of light
 - g. get rid of something completely
 - h. extremely small, tiny
 - i. affected by or showing abnormalities characteristic of cancer
 - j. an abnormal structural change of an organ or part due to injury or disease
- 1....2....3....4....5....6....7....8....9....10....

V. Give English equivalents of the following parts of the body:

- 1. trzustka-
- 2. wątroba-
- 3. płuco-
- 4. mózg –
- 5. prostata-
- 6. nerka-
- 7. kręgosłup-

VI. Match the words on the left (1-8) with the words on the right (a-h) to form collocations that appear in the text and give their Polish translations.

- | | |
|-------------------------------------|----------------|
| 1. (non) cancerous | a. precision |
| 2. high-energy/ focused | b. cameras |
| 3. sub-millimeter/pinpoint/surgical | c. lesions |
| 4. radiosurgery | d. target |
| 5. linear | e. radiation |
| 6. x-ray - guided | f. accelerator |
| 7. motion-tracking | g. system |
| 8. hit the | h. software |

VII. Translate the following sentences into English.

1. Radioterapia ma na celu zniszczenie komórek nowotworu złośliwego.
2. Promieniowanie eliminuje guzy i zmiany chorobowe bezboleśnie i z najwyższą precyzją.
3. Leczenie nie wymaga zabiegu chirurgicznego.
4. Intensywnie skoncentrowana dawka promieniowania dostarczana jest do docelowego guza.
5. Każda wiązka dostarcza niewielką ilość promieniowania.
6. Wszystkie wiązki przecinają się w obrębie guza.
7. Całkowita dawka promieniowania jest wystarczająco wysoka aby zniszczyć raka.

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