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ČARLS BINGAM PENROUZ - VIZIJA ZA BUDUĆNOST

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KLINIKA ZA OPŠTU HIRURGIJU, VOJNOMEDICINSKA AKADEMIJA, BEOGRAD, SRBIJA; (2) ODELJENJE ZA INTERNE BOLESTI, VOJNA BOLNICA NIŠ, NIŠ, SRBIJA; (3) MEDICINSKI FAKULTET, UNIVERZITET ODBRANE, BEOGRAD, SRBIJA

SAŽETAK: Čarls Bingam Penrouz (1862-1925) je poznati američki hirurg i fizičar koji je svoje mesto u istoriji hirurgije obezbedio pronalaskom drena koji je dobio ime po njemu. Penrouz je pohađao koledž Harvard, na kojem je maturirao sa 19 godina sa najvišim priznanjima iz fizike. Sa 22 godine, postao je doktor medicine na Univerzitetu u Pensilvaniji. Nakon toga radio je kao ambulantni hirurg, učestvovao u različitim istraživanjima i vodio medicinsku praksu specijalizovanu za ginekologiju. Godine 1887. osnovao je u Filadelfiji prvu bolnicu koja se bavi isključivo ginekološkim problemima. Zbog zasluga iz ove oblasti 1893. godine, dodeljena mu je titula profesora ginekologije na Univerzitetu u Pensilvaniji. Krajem 19. veka dominantno se bavio hirurškom drenažom i edukacijom hirurga iz ove oblasti, pokušavajući da ih ohrabri da češće koriste ovu proceduru. On je opisao gumeni dren koji se koristio za drenažu trbušne duplje, sve do polovine 20. veka. Dobio je ime po njemu – Penrouzov dren. Vrlo mlad oboleo je od tuberkuloze, a zbog proširenog oblika ove bolesti sa 38 godina morao je da se povuče iz lekarske prakse. Bio je oženjen i otac troje dece. Preminuo je u vozu u blizini Vašingtona, 28. februara 1925. godine, u svojoj 64. godini.

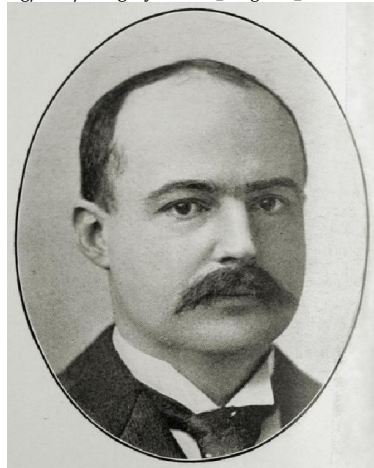
Ključne reči: Čarls Bingam Penrouz, hirurg, dren

U istoriji medicine su postojale široko primenjivane terapije koje izgledaju gotovo smešno s obzirom na savremeno znanje o fiziologiji i medicinskoj praksi, ali u isto vreme igraju važnu ulogu u obrazovanju lekara. Prošlost nam daje lekciju za sadašnjost i pravac za budućnost. Međutim, pri tome uporno moramo vršiti kritičko ispitivanje prošlosti. Još uvek nemamo sve odgovore, ali možemo

potvrditi da su odgovori prisutni. Ali jedan cilj je uvek važan - verujte u sebe i svoje ideje. I to je ono što definiše izuzetne ljude. Jedan od izuzetnih lekara koji je verovao u sebe i svoje ideje bio je Čarls Bingam Penrouz, otac moderne hirurške drenaže. Iz tog razloga je ovaj članak napisan u znak sećanja na otkriće drena nazvanog po njemu.

Slika 1. Čarls Bingam Penrouz

preuzeto sa: https://commons.wikimedia.org/wiki/Category:Charles_Bingham_Penrose#/media/File:CharlesBinghamPenrose.jpg/2



CHARLES BINGHAM PENROSE – A VISION FOR THE FUTURE

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Summary: Charles Bingham Penrose (1862–1925) was a renowned American surgeon and physicist who secured his place in the history of surgery with the invention of a drain named after him. Penrose attended Harvard College, where he graduated at the age of 19 with highest honors in physics. At 22, he earned his Doctor of Medicine degree from the University of Pennsylvania. Following his graduation, he worked as an ambulatory surgeon, participated in various research projects, and ran a medical practice specializing in gynecology. In 1887, he founded the first hospital in Philadelphia dedicated exclusively to gynecological issues. For his contributions to this field, he was awarded the title of Professor of Gynecology at the University of Pennsylvania in 1893. In the late 19th century, Penrose focused primarily on surgical drainage and the education of surgeons in this field, encouraging them to use this procedure more frequently. He described a rubber drain used for abdominal cavity drainage, which remained in use until the mid-20th century. This drain came to be known as the Penrose drain. Penrose contracted tuberculosis at a young age, and due to the advanced form of the disease, he had to withdraw from medical practice at the age of 38. He was married and a father to three children. Charles Bingham Penrose passed away on February 28, 1925, at the age of 64, while on a train near Washington, D.C..

Key words: Charles Bingham Penrose – Surgeon, Drain

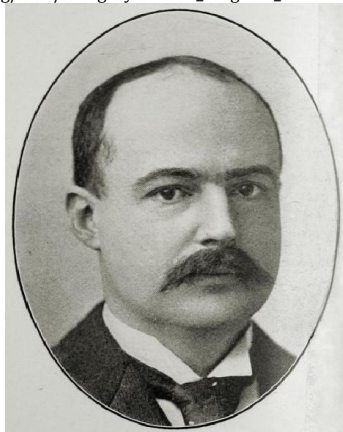
In the history of medicine, there have been widely used therapies that may seem almost laughable in light of modern knowledge about physiology and medical practice, yet they play an important role in the education of physicians. The past provides a lesson for the present and a direction for the future. However, we must persistently engage in critical examination of the past. We still do not have all the answers, but we can affirm that answers

exist. One goal remains always important – believe in yourself and your ideas. And that is what defines exceptional people.

One of the exceptional doctors who believed in himself and his ideas was Charles Bingham Penrose, the father of modern surgical drainage. For this reason, this article was written in memory of the discovery of the drain named after him.

Picture 1. Charles Bingham Penrose

taken from :https://commons.wikimedia.org/wiki/Category:Charles_Bingham_Penrose#/media/File:CharlesBinghamPenrose.jpg/2



Čarls Bingam Penrouz, hirurg, fizičar, prirodnjak, avanturista, rođen je u Filadelfiji 1. februara 1862. godine. Čarlov otac, Ričard Alen Fulerton Penrouz stariji, bio je lekar, profesor akušerstva na Univerzitetu u Pensilvaniji, dok Čarlsova majka, Sara Hana Boies Penrouz, potiče iz Merilenda i usvojena je od strane bogatog bostonskog trgovca. Ubrzo nakon udaje za Ričarda, Sara se isključila iz visokog društva i fokusirala se na obrazovanje svojih sedam sinova. Ričard Alen Fulerton Penrouz poticao je iz ugledne filadelfijske porodice. Jedan brat je bio senator Sjedinjenih Država, a drugi predsednik Nacionalne akademije nauka [1,2].

Čarls se u početku školovao kod privatnih učitelja, tutora. Blizina rekama Delaver i Šuilkil takođe je omogućila Penrouzu da uživa u pecanju, klizanju i plivanju. Njegova prva škola bila je Episkopska Akademija koja se nalazila na Njutnovom Trgu u Pensilvaniji i koju je završio sa najvišim ocenama [2].

Penrouz je pohađao koledž Harvard, na kojem je maturirao sa 19 godina, sa diplomom AB i najvišim priznanjima iz fizike, dva meseca nakon što mu je majka umrla od tuberkuloze. Ubrzo nakon toga, njegovi članci o magnetizmu i elektricitetu su se pojavili u naučnim časopisima [1]. Godine 1882, Penrouz je objavio svoj važan rad „Odnos između površinske energije i termoelektričnosti“ gde je naveo da se termodinamička jednačina može dobiti na

potpuno drugačiji način, ukoliko se energija termoelektrične struje posmatra kao deo energije koji se nalazi na različitoj površini [3].

Upisao je medicinski fakultet Univerziteta u Pensilvaniji, istovremeno nastavljajući studije matematike i fizike na Univerzitetu Harvard kao doktorant. Ovakav način studiranja je dozvoljen od strane Univerzitetskog saveta pod uslovom da Penrouz provede u svakom semestru po 2 meseca na Harvardu. U proleće 1884. godine, u dobi od 22 godine, dobio je diplomu doktora medicine na Univerzitetu u Pensilvaniji i doktora filozofije (PhD) iz fizike na Univerzitetu Harvard. Njegova doktorska teza iz fizike nosila je naslov „Matematička teorija termoelektričnosti i odnos termoelektričnosti i površinske energije“ [2,4].

Nakon što je završio doktorat iz fizike, Penrouz se posvetio radu u medicini. Bio je stalni lekar i ambulantni hirurg u bolnici u Pensilvaniji od 1885. do 1886. i u Filadelfijskom dispanzeru od 1888. do 1893. godine [2]. Dok je bio specijalizant, Penrouz je učestvovao u istraživanju diuretičkih efekata ubrizganog kokaina. Članak „Zapažanja o diuretičkom uticaju kokaina“ objavljen je u lokalnom medicinskom časopisu pod nazivom „The College and Clinical Record“ i rezultat je sugerisao da je diuretička primena ubrizganog kokaina očigledna [5].

Slika 2. Penrouz kao profesor ginekologije Univerziteta u Pensilvaniji

preuzeto sa: <https://www.findagrave.com/memorial/16166622/flower>



Charles Bingham Penrose – Surgeon, Physicist, Naturalist, Adventurer. Charles Bingham Penrose was born in Philadelphia on February 1, 1862. Charles's father, Richard Allen Fullerton Penrose Sr., was a physician and a professor of obstetrics at the University of Pennsylvania, while Charles's mother, Sarah Hanna Boies Penrose, hailed from Maryland and was adopted by a wealthy Boston merchant. Shortly after marrying Richard, Sarah withdrew from high society and focused on educating her seven sons. Richard Allen Fullerton Penrose came from a prestigious Philadelphia family. One brother was a United States senator, and another was president of the National Academy of Sciences [1,2].

Charles initially received his education from private tutors. The proximity to the Delaware and Schuylkill rivers also allowed Penrose to enjoy fishing, ice skating, and swimming. His first school was the Episcopal Academy, located at Newton Square in Pennsylvania, which he graduated from with top honors [2].

Penrose attended Harvard College, where he graduated at the age of 19 with an AB degree and the highest honors in physics, just two months after his mother passed away from tuberculosis. Shortly thereafter, his articles on magnetism and electricity appeared in scientific journals [1].

In 1882, Penrose published his significant work, "The Relation Between Surface Energy and Thermoelectricity," where he stated

that a thermodynamic equation could be derived in an entirely different way if the energy of thermoelectric current is considered as part of the energy present on a different surface [3].

Penrose enrolled in the University of Pennsylvania's medical school while simultaneously continuing his studies in mathematics and physics at Harvard University as a doctoral candidate. This study arrangement was allowed by the University Council on the condition that Penrose spent two months each semester at Harvard. In the spring of 1884, at the age of 22, he received his Doctor of Medicine (MD) degree from the University of Pennsylvania and a Doctor of Philosophy (PhD) in physics from Harvard University. His physics doctoral thesis was titled "Mathematical Theory of Thermoelectricity and the Relation Between Thermoelectricity and Surface Energy" [2,4].

After completing his physics doctorate, Penrose devoted himself to medicine. He served as a staff physician and ambulatory surgeon at a Pennsylvania hospital from 1885 to 1886 and at the Philadelphia Dispensary from 1888 to 1893 [2].

During his residency, Penrose participated in research on the diuretic effects of injected cocaine. The article, "Observations on the Diuretic Effect of Cocaine," was published in the local medical journal *The College and Clinical Record* and suggested that the diuretic effect of injected cocaine was apparent [5].

Slika 2. Penrose as a Professor of Gynecology at the University of Pennsylvania

taken from: <https://www.findagrave.com/memorial/16166622/flower>



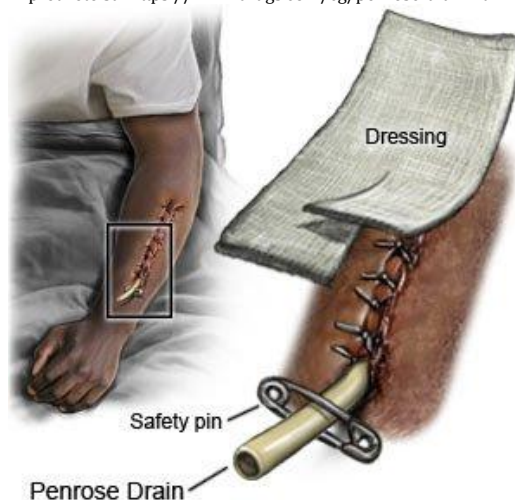
Kao lekar Penrouz je vodio medicinsku praksu specijalizovanu za ginekologiju. To ga je dovelo do toga da 1887. godine uspostavi „Gynecean“ bolnicu, prvu medicinsku ustanovu u Filadelfiji koja se bavi isključivo ginekološkim problemima. Nakon što je 1891. godine oboleo od tuberkuloze, Penrouz je na neko vreme napustio svoju medicinsku praksu i preselio se u Vajoming radi oporavka. Tamo se u potpunosti posvetio fizičkoj aktivnosti: ujutro je kopao krampom i lopatom, a popodne jahao konje. Početkom sledeće godine zdravstveno stanje mu se značajno poboljšalo. Vrativši se u Filadelfiju 1893, dodeljena mu je titula profesora ginekologije na Univerzitetu u Pensilvaniji. Kolege su Penrouza smatrale veštima, kompetentnim hirurgom [1,6].

Godine 1889. Penrouz je Američkom medicinskom udruženju predstavio svoje stavove u odbrani drenaže u abdominalnoj hirurgiji. U kasnom 19. veku, hirurzi su bili podeljeni oko

toga da li drenažne cevi u abdominalnoj hirurgiji treba koristiti retko ili često. U to vreme većina hirurških drenova je bila napravljena od staklenih cevi ili gaze. Ove vrste drenova mogu oštetiti okolno tkivo ili urasti u njega, što dovodi do infekcije. Takođe, oštećenje creva se često dešavalo prilikom uklanjanja drenova [7]. Penrouz je priznao da se mnogi hirurzi plaše upotrebe drenažnih cevi i objasnio kako su, uz pravilno rukovanje i pažljivo čišćenje, takvi strahovi bili neosnovani. On je opisao gumeni dren koji je ubačen direktno kroz ranu u trbušnu duplju, formirajući kanal kroz koji izlazi krv i druge tečnosti iz trbuha. U svojoj knjizi „Udžbenik ženskih bolesti“ objavljenj 1897. godine, on ilustruje dren napravljen od cevaste gumene folije i punjen gazom. Njegov čuveni savet hirurzima je „Kada ste u nedoumici, drenirajte!“ [1,2].

Slika 3. Princip rada Penrouzovog drena

preuzeto sa: <https://www.drugs.com/cg/penrose-drain.html>



Zanimljiva činjenica je da je prvi gumeni dren Penrouz dizajnirao od kondoma sa odsečenim vrhom. Druga činjenica je da je Penrouzov dren postao dominantna metoda hirurške drenaže, sve do uvođenja Jackson-Pratt (aspiracione) drenaže 50-ih godina XX veka [8].

Penrouzov fizički izgled i impresivan stas izjednačili su se sa njegovom intelektualnom i profesionalnom besprekornosti. U leto 1882. godine, sa 20 godina, jahao je konjem od Filadelfije do Nijagarinih vodopada i nazad, sa 28 godina je preplivao 15 milja (24 km) u okeanu za

5 sati [1]. Nekoliko godina kasnije, dok je lovio u Montani, Penrouz je ustrelio mladunče srebrnog medveda (grizlija), a nakon što je to otkrila majka mladunčeta, je teško ranila Čarlsa. Penrouz je sebi spasao život pucajući tokom borbe u vrat medveda koji ga je napao [9].

Iako je bio jedan od sedmoro braće, Penrouz je jedini od njih imao decu. Oženio se Katarin Dreksel 1892. Čerku po imenu Sara su dobili 1896. godine, a četiri godine kasnije i sina po imenu Čarls, ali je dete umrlo 1901. Godine.

As a physician, Penrose ran a medical practice specializing in gynecology. This led him to establish the Gynecean Hospital in 1887, the first medical institution in Philadelphia dedicated exclusively to gynecological issues. After contracting tuberculosis in 1891, Penrose temporarily left his medical practice and moved to Wyoming for recovery. There, he fully committed to physical activity: in the mornings, he worked with a pickaxe and shovel, and in the afternoons, he rode horses. By early the following year, his health had significantly improved. Returning to Philadelphia in 1893, he was appointed Professor of Gynecology at the University of Pennsylvania. Colleagues regarded Penrose as a skilled and competent surgeon [1,6].

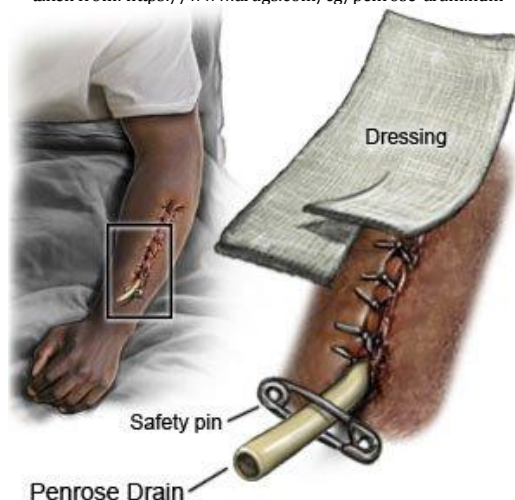
In 1889, Penrose presented his views defending drainage in abdominal surgery to the American Medical Association. In the late 19th century, surgeons were divided over whether

drainage tubes in abdominal surgery should be used rarely or frequently. At that time, most surgical drains were made of glass tubes or gauze. These types of drains could damage surrounding tissue or become embedded in it, leading to infection. Additionally, bowel damage often occurred during drain removal [7].

Penrose acknowledged that many surgeons feared using drainage tubes and explained that, with proper handling and careful cleaning, such fears were unfounded. He described a rubber drain inserted directly through the wound into the abdominal cavity, forming a channel through which blood and other fluids could exit the abdomen. In his book "Textbook of Women's Diseases," published in 1897, he illustrated a drain made from tubular rubber sheeting and filled with gauze. His famous advice to surgeons was: "When in doubt, drain!" [1,2].

Picture 3. Principle of Operation of the Penrose Drain

taken from: <https://www.drugs.com/cg/penrose-drain.html>



An interesting fact is that the first rubber drain designed by Penrose was made from a condom with its tip cut off. Another fact is that the Penrose drain became the dominant method of surgical drainage until the introduction of the Jackson-Pratt (suction) drain in the 1950s [8].

Penrose's physical appearance and impressive stature matched his intellectual and professional impeccability. In the summer of 1882, at the age of 20, he rode a horse from

Philadelphia to Niagara Falls and back. At 28, he swam 15 miles (24 km) in the ocean in 5 hours [1]. A few years later, while hunting in Montana, Penrose shot a silver bear (grizzly) cub. After the bear's mother discovered this, she severely injured Charles. Penrose saved his own life by shooting the bear in the neck during the struggle [9].

Although he was one of seven brothers, Penrose was the only one to have children. He married Catherine Drexel in 1892. They had a

Bojs Penrouz, njihovo treće dete, postao je pisac i istoričar [2,10].

Zbog proširenog oblika plućne tuberkuloze, 1899. godine sa 38 godina, povukao se iz lekarske prakse do kraja svog života. Ponekad je putovao na Zapad, nadajući se da će ga vazduh, nadmorska visina, sunčeva svetlost i vežbanje izlečiti [9].

Poslednjih godina života Čarls je bio lošeg zdravstvenog stanja. Zimu 1924/25. godine proveo je u Južnoj Karolini pokušavajući da se oporavi od tuberkuloze. Penrouz je planirao da se vrati vozom u Filadelfiju u poseti rodbini u pratnji dve medicinske sestre i rođake Sare. Pronađen je mrtav u svom kupeu u blizini Vašingtona, 28. februara 1925. godine, u svojoj 64. godini. Sumnjalo se da je srčani udar uzrok smrti [9].

Slika 4. Porodična grobnica Čarlsa Bingama Penrouza
preuzeto sa: <https://www.findagrave.com/memorial/16166622/charles-bingham-penrose>



Sahranjen je na groblju Laurel Hill u Filadelfiji. Najveći deo bogatstva ostavio je svojoj deci, a 100.000 dolara je ostavio medicinskoj sestri koja se brinula o njemu do smrti [1].

Sukob interesa: Autori izjavljuju da nemaju sukob interesa.

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daughter named Sarah in 1896, and four years later, a son named Charles, who unfortunately died in 1901. Their third child, Boys Penrose, became a writer and historian [2,10].

Due to the advanced form of pulmonary tuberculosis, in 1899, at the age of 38, Penrose retired from medical practice for the rest of his life. He occasionally traveled west, hoping that the air, altitude, sunlight, and exercise would cure him [9].

In his final years, Charles's health deteriorated significantly. He spent the winter of 1924/25 in South Carolina, trying to recover from tuberculosis. Penrose planned to return to Philadelphia by train to visit relatives, accompanied by two nurses and his cousin Sarah. He was found dead in his train compartment near Washington, D.C., on February 28, 1925, at the age of 64. A heart attack was suspected to be the cause of death [9].

Picture 4. The Family Tomb of Charles Bingham Penrose

taken from: <https://www.findagrave.com/memorial/16166622/charles-bingham-penrose>



He was buried at Laurel Hill Cemetery in Philadelphia. The majority of his fortune was left to his children, and \$100,000 was bequeathed to the nurse who cared for him until his death [1].

Conflict of Interest: The authors declare no conflict of interest.

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